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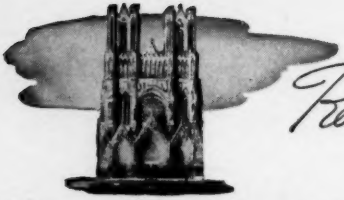

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ACCREDITING OF U. S. DENTAL SCHOOLS

Report of the Council on Dental Education
American Dental Association

This report deals entirely with the consummation of the undertaking which has principally engaged the attention of the Council since its organization in 1938; namely, the accrediting of dental schools. For the record, a brief review of the steps that have been taken to this end is presented.

Established under constitutional provisions by the American Dental Association in 1937 as the successor to the Dental Educational Council of America, the Council on Dental Education held its first meeting in May 1938. The first year was largely given to the formulation of aims and purposes and to a statement of the general principles and the basic criteria which would guide the Council in its study of the dental schools. This statement was published and widely distributed in April 1939.

July 1, 1940, a full-time secretary of the Council was appointed and installed in the Central Office of the American Dental Association and plans for a comprehensive survey of dental education were promptly developed. The formal "Requirements for the Approval of a Dental School" were published in December 1940, and it was then announced that visitation of the schools would be begun in October 1942. Time was advisedly given between the issuance of the "Requirements" and the beginning of visits to the schools in order to afford all schools opportunity to study the requirements and to make such changes or adjustments in organization and curriculum as they might deem desirable. During this period, a comprehensive questionnaire in a series of eleven forms was addressed to the schools. Returns from this inquiry were duly received and studied in detail by the Council prior to the beginning of visits to the schools.

Pearl Harbor and the outbreak of the war raised immediate question of the wisdom of pursuing the survey during the emergency. This question was brought to the fore when the dental schools embarked upon the accelerated plan of instruction and looked forward to the participation of the Army and the Navy in their programs. The Council

*Council on Dental Education; Roy O. Elam, chairman, Wilbert Jackson, vice chairman, John G. Hildebrand, William N. Hodgkin, Bert L. Hooper, John T. O'Rourke, M. Webster Prince, J. Ben Robinson, Minor J. Terry and Harlan H. Horner, Secretary.

conferred at length with the schools and with the state examining boards in dentistry throughout the country and found that the preponderant view favored the continuance of the announced plans. Several government agencies also expressed a desire to have lists of approved schools as early as possible.

Accordingly, visits to the schools were begun in October 1942 and concluded in June 1943. A committee of three representatives of the Council visited each school, the secretary being one of the three in all cases. The secretary gave attention to matters of organization, administration, admission, faculty, library, support and university relationship, and the two other members of the committee appraised the clinical and the basic science teaching. Each member of the Council visited three or more schools and three guest visitors, outside the membership of the Council, participated in the visits to the schools. All committees followed instructions and reported upon forms prepared in advance by the Council.

After the visits to the schools were concluded in June 1943, the reports of the visitors and the assembled documentary data were studied together at length and the schools were ranked in their order of merit, according to the findings of the Council, from one to thirty-eight. To this end, the schools were first ranked in each of the several divisions of the survey as follows: admission, physical plant and equipment, faculty, organization and administration, library, financial management and support, clinical teaching, basic science teaching, research and hospital relationship. The separate criteria under each of these divisions were given relatively weighted values and the score in each division was reduced to points. Weighted values were then given to each division as a part of a whole and the points in each division were combined in terms of the basic weights to determine the final rank of the school. The basic weights in terms of 100 as the whole were assigned as follows: admission, 5; physical plant and equipment, 8; faculty, 10; organization and administration, 5; library, 7; financial management and support, 15; clinical teaching, 20; basic science teaching, 20; research, 5, and hospital relationship, 5.

This work of ranking the schools on a comparative basis required intensive studies in the office of the secretary, special assignments to individuals and to committees of the Council and special Council meetings. The studies and the ranking of the schools were completed in January 1943.

The next step was the preparation of a confidential report to each school. This report gave each school its comparative rank in tenths in each division of the survey and its final rank in tenths in the survey as a whole. A pattern map graphically setting forth the comparative standing of each school was included in each report. The reports were all drawn in a constructive vein, weaknesses were frankly pointed out, favorable findings were discussed and effort was made to emphasize the Council's view concerning the most pressing needs of improvement in each school. These reports were originally drafted in the secretary's office and were then sent for review to the two other representatives of the Council who visited the particular school in question with the secretary. They were then reviewed in each case by a member of the Council assigned to that task before being put into final form for delivery to the school. This important undertaking was carried forward without interruption for several months and was concluded in August 1944.

It became apparent early in the survey that, in justice to certain schools, a second visit of inspection would be necessary. This situation arose through marked changes in some schools which the Council found taking place or in early contemplation at the time of its first visit.

Indeed, the Council regards the greatest long-range value of its survey to be the interest which the survey has revealed on the part of practically all of the schools in making their contribution toward elevating the common level of dental education in the United States. Much has already been done in many schools, even in wartime, and under the operation of the accelerated plan of instruction, to improve their status.

The Council has emphasized the importance of a well-chosen and properly administered dental school library and has stressed the fact that it is indispensable to a satisfactory teaching program. Some schools have long maintained excellent libraries. Gratifying response has been made in nearly all of the schools to the suggestions of the Council, and the physical appointments in several libraries have been completely made over.

Dental education is entitled, the Council believes, to housing and equipment on a level with the accommodations provided by universities for instruction in other professional fields. The housing, the materials with which to work, the care and sanitation of the entire plant of a dental school inevitably enter into the character and quality of the teaching. In the war years, there has been no building and little means for keeping equipment up to date. An unprecedented building campaign on behalf of dental education will be begun as soon as building materials are available. A dozen schools are contemplating the erection of new buildings, and plans for some of these buildings are already drawn.

The Council found, before Pearl Harbor, a shortage of full-time teachers qualified to meet the demands of the dental curriculum. This shortage has been aggravated by the war and can be met only on a long range basis by special advanced training for teachers in several of the leading dental schools. The Council is gratified at the interest which all schools show in the improvement of the quality of their teaching and in the prospect that a sufficient number of graduates in dentistry may be interested in advanced studies with a view to teaching careers.

The Council continues to urge that all dental schools be identified with approved universities or be conducted on the level of a university discipline. Twelve of the thirty-nine dental schools in the United States are now integral units in state universities, and twenty-three are integral units in privately endowed universities. Two of the remaining four are units in well-supported medical and health centers, one publicly and one privately supported. One school has nominal affiliation only with a university and steps are underway to integrate it fully with the university with which it is affiliated. One school remains wholly detached from either a medical school or a university and plans for the integration of this detached school with a university are under consideration. The Council, therefore, envisages the early day when all dental education will be administered and conducted as a university discipline.

When its survey of the dental schools began, the Council contemplated the establishment of one list of approved schools. As the survey progressed, it became apparent that a wide range of accomplishment exists between the schools which maintain a reasonably satisfactory standard and those which do not rise in certain particulars in all phases of their performance to the level which the Council fixes as a satisfactory standard. The schools in the first group are all established on an enduring basis; with few exceptions are adequately housed and equipped, and have, in most instances, a staff of teachers in training and in number equal to the demands of the dental educational program. They are by no means perfect, but such weaknesses and deficiencies as they have are mainly subject to correction within the

existing organizations and within the present means of support. The schools in the second group have marked weaknesses or deficiencies in one or more phases of their work, and some, if not all, of them will be obliged to employ heroic measures to bring their teaching programs up to a permanently satisfactory level. The schools in the second group are all meeting an existing need in their several locations and their continuance and improvement are highly desirable from every point of view.

The Council believes that it would be a disservice to the schools in these two groups to attempt to classify them at this time in one category. Accordingly, the Council has classified the schools which it accredits as "approved" and as "provisionally approved."

The Council regrets that it finds two schools which, in its judgment, do not merit either approval or provisional approval at this time. These schools will be promptly resurveyed when they afford evidence of definite improvement.

The Council hopes that the majority, if not all, of the schools now given provisional approval will be able, in a reasonably short time, to qualify for full approval and is prepared to advise with them with reference to the steps which it feels that they should take in order to receive such approval. In the meantime, the Council recommends to all dental licensing boards that the graduates of all schools approved and provisionally approved be admitted to licensing examinations and hopes that any statutory provisions or local regulations which stand in the way may be modified to permit the recognition of these schools.

The basic reason for the classification of the schools as approved and as provisionally approved is the yet widespread lack of material support. Not all of the schools among those fully approved have a satisfactory basis of support and perhaps all could use added funds effectively. Very few of the schools provisionally approved have adequate support. These schools are, in the main, forced to rely fundamentally upon receipts from tuition, fees and clinics. In few cases are these sources of income sufficient to sustain an enduringly sound program of dental education. The overall issue, therefore, before dental education in the United States is a more generous support by society of the entire program of the education of dentists. The schools approved and provisionally approved are happily all bona fide educational institutions, organized and conducted on a nonprofit basis and mainly through well-recognized universities. Society needs all of these schools and owes them support commensurate with their past accomplishments and with the service that they are able to render in the future.

Granted adequate support from enduring sources and established as an integral unit of a modern university, the dental school of the future must nevertheless meet continuing problems. A curriculum in a live professional school can never be static. Investigation, experimentation, inquiry and orderly research must go hand in hand with progressive teaching. Dental schools must come to realize more fully than they ever have before that education is a science and teaching a fine art and that the trend in professional education on the university level is toward the wider employment of trained persons disposed to devote their lives singly to teaching and research.

Finally, above all else, the days ahead will call for a widening concept of dental education and dental practice as health measures, with as much emphasis upon the biologic aspects of dentistry as a basic health measure as both the schools and the profession have given in the past to the development of dentistry as a fine mechanical art.

List of Accredited Schools

The schools are accredited as "approved" and as "provisionally approved." Provisional approval is indicated by an asterisk, and the entire list is arranged in alphabetical order by states.

California

*School of Dentistry, College of Physicians and Surgeons, San Francisco.

College of Dentistry, University of California, San Francisco.

*College of Dentistry, University of Southern California, Los Angeles.

District of Columbia

*School of Dentistry, Georgetown University, Washington.

*College of Dentistry, Howard University, Washington.

Georgia

*Atlanta-Southern Dental College, School of Dentistry, Emory University, Atlanta.

Illinois

Chicago College of Dental Surgery, School of Dentistry, Loyola University, Chicago.

Dental School, Northwestern University, Chicago.

College of Dentistry, University of Illinois, Chicago.

Indiana

School of Dentistry, Indiana University, Indianapolis.

Iowa

College of Dentistry, State University of Iowa, Iowa City.

Kentucky

School of Dentistry, University of Louisville, Louisville.

Louisiana

*School of Dentistry, Loyola University, New Orleans.

Maryland

Baltimore College of Dental Surgery, Dental School, University of Maryland, Baltimore.

Massachusetts

Dental School, Tufts College, Boston.

Michigan

*School of Dentistry, University of Detroit, Detroit.

School of Dentistry, University of Michigan, Ann Arbor.

Minnesota

School of Dentistry, University of Minnesota, Minneapolis.

Missouri

Kansas City-Western Dental College, School of Dentistry, University of Kansas City, Kansas City.

*School of Dentistry, St. Louis University, St. Louis.

School of Dentistry, Washington University, St. Louis.

Nebraska

College of Dentistry, University of Nebraska, Lincoln.

New York

School of Dental and Oral Surgery, Columbia University, New York City.

*College of Dentistry, New York University, New York.

School of Dentistry, University of Buffalo, Buffalo.

Ohio

College of Dentistry, Ohio State University, Columbus.

School of Dentistry, Western Reserve University, Cleveland.

Oregon

*School of Dentistry, North Pacific College of Oregon, Portland.

Pennsylvania.

*School of Dentistry, Temple University, Philadelphia.

The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, Philadelphia.

School of Dentistry, University of Pittsburgh, Pittsburgh.

Tennessee

School of Dentistry, Meharry Medical College, Nashville.

College of Dentistry, University of Tennessee, Memphis.

Texas

*Texas Dental College, School of Dentistry, University of Texas, Houston.

Virginia

School of Dentistry, Medical College of Virginia, Richmond.

Wisconsin

Dental School, Marquette University, Milwaukee.

Note: The Harvard School of Dental Medicine was not included in the original survey. It will be considered for approval at a later date.

EFFECT OF ACID BEVERAGES CONTAINING FLUORIDES UPON THE TEETH OF RATS AND PUPPIES*

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For several centuries, the effect of acids upon teeth has been a matter of concern.[1] For the most part, research in this field has followed three channels. The first has been concerned with the production of acids by bacterial action on carbohydrate foods; the second, with the effect of acids upon teeth *in vitro;* the third, with the role of saliva in the etiology of caries. During the past two decades, additional research has been promoted by the discovery that the development of caries is inhibited by the presence of small amounts of fluorides in the drinking water.

While much attention has been devoted to the production of organic acids in the mouth by micro-organisms, relatively little study has been given to the effect of the presence of acids in foods or beverages. From very early times, foods preserved in acids have been consumed by man. Habits have changed the amounts of such foods that are eaten, but, very likely, the total acid that the average man ingests has increased during the past few decades, owing to the greater consumption of citrus fruits, acidified candies and soft drinks.

Several studies have been made to determine the relative effect of different acids on extracted teeth by immersing the teeth, or portions of them, such as the enamel, in acid solutions. Thurlow and Bunzell[2] concluded that the solubility of enamel was dependent not solely on the hydrogen ion concentration, but also on other conditions, governed by the anion of the acid used. Thus, they observed that enamel was most readily soluble in nitric acid and progressively less so in phosphoric, tartaric, lactic, citric, acetic, hydrofluoric and sulfuric. Benedict and Kanthak,[3] in studies with powdered enamel, found that the rate of

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*The opinions and views set forth in this article are those of the writers and are not to be considered as reflecting the policies of the Navy Department.

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¶Lieutenant Commander, H(S), USNR.

1. Bunting, R. W., and Hill, T. J.: Oral Pathology. Philadelphia: Lea & Febiger, 1940, p. 159.

2. Thurlow, Sylvia, and Bunzell, H. H.: Tooth Decay Studies. I. Effect of Acids on Tooth Tissue. D. Cosmos, 69:20, January 1927.

3. Benedict, H. C., and Kanthak, F. F.: Solubility of Dental Enamel in Various Buffered Solutions. J. D. Res., 12:277, April 1932.

solution was most rapid during the first few minutes; an indication that the organic matrix slowed the rate of solution. Some specific effects of the presence of anions have been observed by Souder and Schoonover,[4] who state that the fluoride ion reacts with calcium to form deposits of highly insoluble calcium fluoride.

Some observations have been recorded in the literature in regard to the effect upon human teeth of consumption of acids in foods. Thus, Pickerill,[5] in reviewing this subject, called attention to the fact that the Sicilian lemon eaters had teeth that were badly etched. Also, West and Judy[6] concluded that on contact with candies having an acidity (in water) of pH 2.5 to 2.8, enamel would be dissolved. They found the citrate ion to be an additional factor in decalcification.

The studies of McClure[7] have indicated the usefulness of the white rat in studying the effect on teeth of drinking acid beverages. This animal is well suited to such experiments because it may consume as much as half of its body weight daily of solutions containing 10 per cent sucrose. The fondness of the rat for solutions of other sugars as well as sucrose has been indicated by the work of Richter.[8] We have observed that the rat also likes sweetening agents such as saccharin and dulcin, so that either a sugar or one of these substances can be added to acid solutions to promote greater acid consumption.

In our studies, attention has been devoted chiefly to one widely consumed soft drink having a pH of 2.6. Answers have been sought to the following questions: 1. How rapidly does this acid drink act upon the teeth of rats and dogs when definite amounts are drunk each day? 2. Is the acid of this beverage modified in its action by the presence of sucrose? 3. Will the addition of some substance such as sodium fluoride decrease the effect of this beverage upon teeth?

EXPERIMENTAL

In an initial experiment, some extracted human teeth were immersed in a common "cola" beverage. When first inspected after two days' immersion, the enamel surface was found to be grossly decalcified.

A series of feeding trials were then initiated, using young white rats, mostly from 6 to 8 weeks of age. For any given experiment, they were grouped as comparably as possible according to age, weight, litter and sex.

The cola drink used in the exploratory experiments was purchased from a dispensing machine. When analyzed chemically, it was found to contain 10 per cent by weight of sucrose and 0.055 per cent of phosphoric acid (H_3PO_4). Electrometric pH measurements showed it to have an acidity equal to pH 2.6. In most later studies, sugar-phosphoric acid solutions of the same strength and pH as the commercial drink were used in the interest of economy.

At the completion of each experimental period, the rats were killed, the heads autoclaved for fifteen minutes at about 115 C. and the jaws dissected and preserved in 80 per cent alcohol or 10 per cent formaldehyde. The molars of the upper and lower jaws were then carefully examined under a dissecting microscope and the extent of damage to the enamel evaluated. The follow-

4. Souder, Wilmer, and Schoonover, I. C.: Experimental Remineralization of Dentin. J.A.D.A., 31:1579, December 1, 1944.

5. Pickerill, H. P.: Prevention of Dental Caries. London: Bailliere, Tindall and Cox, 1923, pp. 133-211.

6. West, E. S., and Judy, F. R.: Destruction of Tooth Enamel by Acidified Candies. J. D. Res., 17:499, December 1938.

7. McClure, F. J.: Destructive Action in Vivo, of Dilute Acids and Acid Drinks and Beverages. J. Nutrition, 26:251, September 1943.

8. Richter, C. P.: Total Self-Regulatory Functions in Animals and Human Beings. Harvey Lectures, Series 38, p. 63, 1942-1943.

ing arbitrary grading system was set up to evaluate numerically the destruction of each molar: no effect, 0; high polish of lingual enamel, 1; slight etching of lingual enamel, 2; mild destruction of lingual enamel; evidence of slight ridge formation at gingival margin, 3; moderate destruction of lingual enamel; ridging more definite; some exposure of dentin, 4; severe destruction of lingual enamel; marked ridge at gingival margin; moderate exposure of dentin, 5; almost complete destruction of lingual enamel with definite evidence of destruction on other surfaces; marked exposure of dentin with some destruction, 6.

After each molar was graded, the values for each half jaw were averaged. The four values assigned to the half jaws were then added to give the total score for a rat. Thus, a total score of 4 would be obtained if all the molar teeth exhibited a high polish, but no etching; a total score of 8 would mean that the "average" molar showed only slight etching of the enamel with no ridge formation at the gum line, etc. This method of grading has given reproducible results in the hands of different observers.

The initial experiments, started in the autumn of 1943, were set up to study (a) the action of the cola drink on the teeth of rats over variable periods of ingestion and (b) the relative effectiveness of fluoride, when contained in the acid beverage, in counteracting the destructive action of the acid. In these studies, nearly 200 white rats were used. All those ingesting a given solution were caged together and allowed free access to feed and solution. Records were kept of the fluid intake of each group. At regular intervals up to two months, a given number of rats in each group were killed and the jaws removed for inspection. The effects of the following solutions were compared: (a) water, (b) cola, (c) phosphoric acid (0.055 per cent), (d) sucrose (10 per cent), (e) sucrose (10 per cent) containing phosphoric acid (0.055 per cent), (f) cola containing 2 parts per million of fluorine (as sodium fluoride), (g) solution (e) containing 2 parts per million of fluorine, (h) solution (e) containing 6 parts per million of fluorine.

In all subsequent experiments, the animals were placed in individual cages in order to control exactly the intake of fluid and food. In these later studies, each rat, during the experimental period, received daily 10 gm. of a ground dog food of known composition,* and 20 cc. of the appropriate solution, 10 cc. in the morning and 10 cc. at the end of the afternoon.

The effect of fluorine (as sodium fluoride), added to the sucrose-acid solution, on the molars of rats receiving identical amounts of food and solution was tested on several occasions. In each instance, the rats were divided into three matched groups of three or four animals each. The first group received the 10 per cent sucrose solution; the second, the sucrose-phosphoric acid solution; the third, the sucrose-phosphoric acid solution containing 6 parts per million of fluorine. After seven days (in one instance, five days), the rats were killed and their teeth examined.

To determine the influence of different levels of fluorine in the acid drink and the extent to which the etching of the teeth might be related to the length of the experiment, twenty additional rats were divided into five groups of four rats each. Each group received one of the following solutions: sucrose; sucrose-acid, and sucrose-acid containing 1, 6 and 20 parts per million of fluorine respectively. Half of the animals were killed after one week; the others, after two weeks.

The effect of the presence of sucrose in modifying the acid action on the teeth was ascertained by comparing the sucrose-acid drink with a solution contain-

*G.L.F. dog feed from Canadaigua, N. Y.

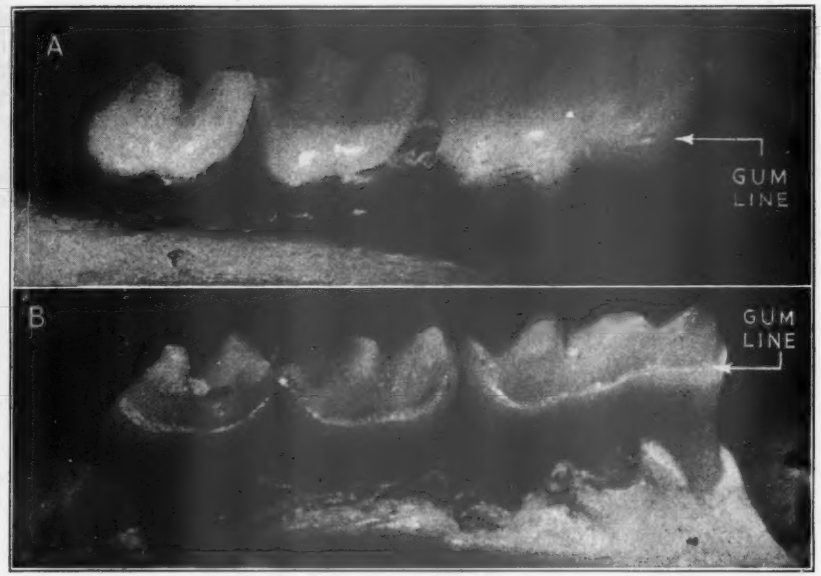

Fig. 1.—*A*, normal rat molars (lingual view) after two months of drinking 10 per cent sucrose solution. *B*, enamel of rat molars destroyed to gum line by two months drinking of solution of 10 per cent sucrose containing 0.055 per cent phosphoric acid.

ing 357 mg. of saccharin and 0.55 gm. of phosphoric acid per liter. The solutions were of comparable sweetness and pH. Four rats were maintained on each solution for one week before their teeth were inspected. To verify the validity of the results obtained, the experiment was repeated a few weeks later.

Finally, to determine whether viscosity might be an important factor in the action of sucrose-acid solutions, a water-soluble, but physiologically inert substance was added to the saccharin-acid to give it a viscosity equal to that of the sucrose-acid solution. For this purpose, dimethoxy-cellulose ("methocel," 15 centipoises) was included at a concentration of 0.15 per cent.

In order to extend our findings on rats to another species, similar studies were started, using dogs. A mongrel litter of six was placed on experiment when the puppies were 10 weeks of age. During the initial period of two weeks, they were allowed to drink 500 cc. daily of a solution containing 10 per cent sucrose to accustom them to sweet solutions. At the end of this period, they were given 500 cc. of the following solutions daily: 350 cc. in the morning, and 150 cc. in mid-afternoon.

Dog 1: Sucrose (10 per cent).

Dog 2: Sucrose (10 per cent) containing phosphoric acid (0.055 per cent).

Dog 3: Same as No. 2.

Dog 4: Same as No. 2, containing 20 parts per million of fluorine.

Dog 5: Same as No. 2 containing 1 part per million of fluorine.

Dog 6: Distilled water.

The same dry feed was used as in the rat experiments. The deciduous teeth, since they were about to fall out, were extracted and inspected under the microscope. Later, the permanent teeth will be examined.

RESULTS AND COMMENT

Shortly after this research was inaugurated, McClure[7] reported that the presence of acid beverages and juices had a decidedly destructive effect on the molars of white rats. Among the materials he studied were a cola drink, gingerale, grapefruit juice and cranberry juice. Our observations confirm and extend McClure's findings with respect to cola drinks.

No difficulty was encountered in getting the rats to consume 20 cc. daily of the sweetened acid solutions. In fact, the contrary was true: Whereas the control animals would drink only from 5 to 15 cc. of water per day, rats allowed free access to a 10 per cent sucrose solution, either with or without acid, would drink up to 50 cc. per day during the first week or two, and later might increase their consumption to more than 90 cc. daily.

Without exception, the cola drink was found to be damaging to the enamel on the molars of rats. Comparable effects were obtained with the sucrose-phosphoric acid solution similar in composition to the commercial beverage. (Fig. 1.) The greatest damage to the molars occurred within the first five to seven days and then proceeded at a slower rate. There appeared to be some variation between individual rats in the rate

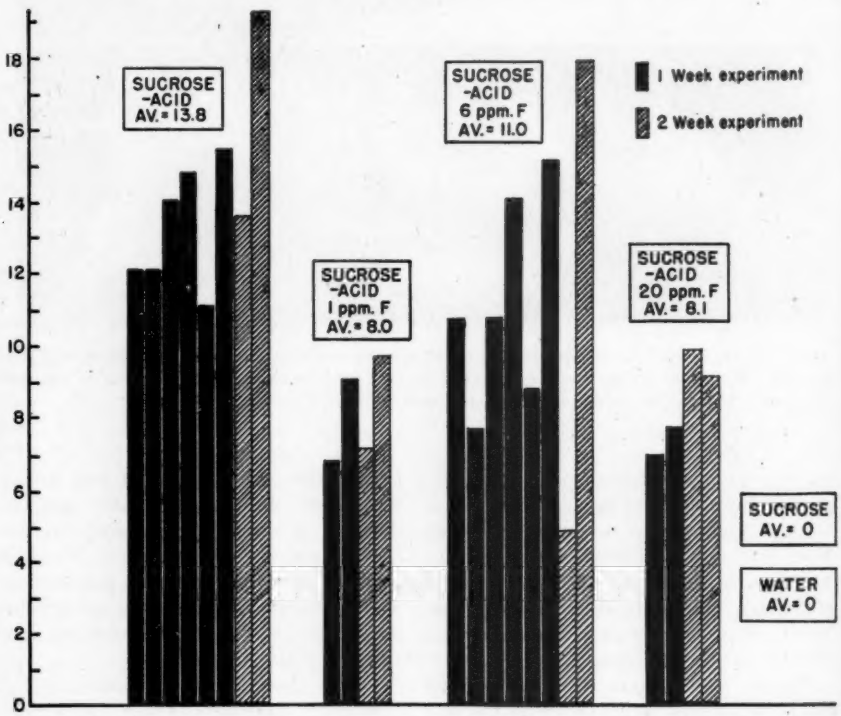

Fig. 2.—Relative degree of enamel destruction (left): Typical data showing effect of ingestion of sucrose-acid solutions, with and without fluorine, on molars of rats. Each bar represents one animal. In each of the two control groups, four animals were used.

and amount of destruction produced by consumption of a given sucrose-acid solution. In all instances, consumption of the sugar solution alone failed to affect the teeth.

The results of the experiments in which fluoride was incorporated in the sucrose-acid solution at levels ranging from 1 to 20 parts per million indicated that the presence of this ingredient substantially, but not completely decreased the destructive action of the acid on the enamel. (Fig. 2.) Although the teeth of some of the rats were not protected by the presence of fluorine, at least three-fourths of all the animals studied received positive protection therefrom. No significant difference in the protection afforded the molars was apparent for the different levels of fluorine tested.

The evidence suggests that the fluorine acted directly on the enamel surfaces as the solution came in contact with the teeth. If the action were primarily systemic, the presence of fluorine in the food, if capable of being absorbed and utilized by the animal, should have been as effective as the presence of fluorine in the drink. The ground dog-food used in these studies was found by analysis to contain 20 parts per million of fluorine, yet the molars of the rats receiving it together with the acid-sucrose solution became decidedly affected, while only 1 part per million of fluorine added to the same solution appreciably counteracted this acid effect. This conclusion as to the primary mode of action of fluorine is in harmony with the observations of others who have failed in at-

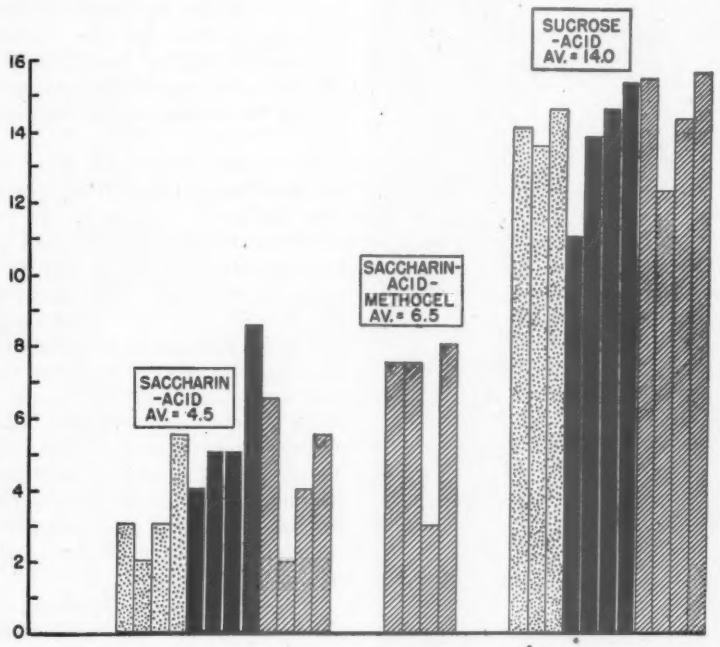

Fig. 3.—Relative degree of enamel destruction (left): Relative effects in vivo on molars of individual rats, of saccharin-acid, saccharin-acid-methocel and sucrose-acid solutions of pH 2.6. The three types of shading represent different experiments.

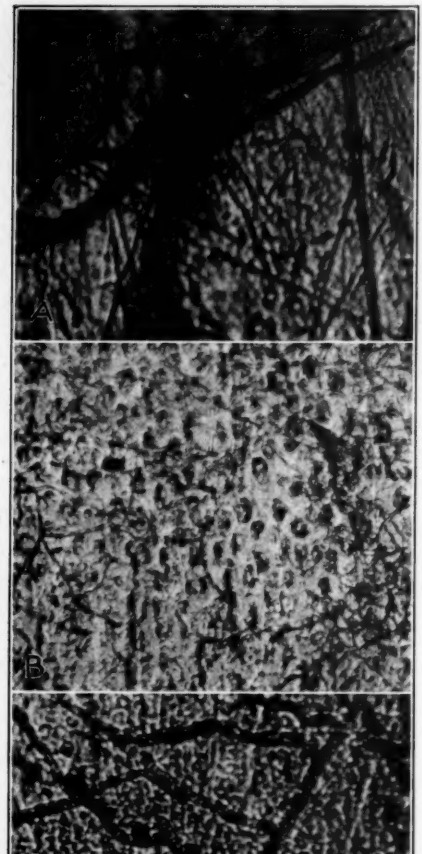

Fig. 4.—Photomicrographs (× about 1,000) of enamel surface of deciduous incisors from three puppies, after three weeks of ingesting 10 per cent sucrose-0.055 per cent phosphoric acid solution, both with and without fluorine, in comparison to sucrose control. *A*, normal appearance of enamel after drinking of 10 per cent sucrose solution. The enamel rods and interprismatic substance are not visually differentiated. The many abrasion marks are characteristic of the normal tooth surface. *B*, pitted appearance of enamel after ingestion of sucrose-acid. The surface resembles one that has been subjected to the action of acid in vitro. *C*, enamel surface after ingestion of sucrose-acid solution containing 20 parts per million of fluorine. Although the interprismatic substance and enamel rods are readily distinguished, the surface appears much less affected than in *B*.

tempts to relate food fluorine to the inhibition of dental caries, but have found a good correlation between the presence of fluorine in the drinking water and the incidence of caries.

The study of the effect on molars of rats drinking a saccharin-acid solution as compared with a sucrose-acid solution of equal acidity and sweetness, when consumed in equal amounts by the two matched groups of animals, indicated that the presence of the sucrose-acid combination caused considerably more damage to the enamel than did the presence of the saccharin-acid solution. (Fig. 3.)

The exact reasons for these results are not clear. At first, it was postulated that the more viscous nature of the sucrose-acid solution, which had a relative viscosity of 1.326 at 100 F. (body temperature of the rat), as compared with a value of 1.003 for the saccharin-acid solution, might cause this difference. In comparing the effects of the sucrose-acid with a saccharin-acid-methocel solution of the same sweetness, pH and viscosity (Fig. 3), it was determined that the presence of the latter had little more destructive effect on the molars than did that of a saccharin-acid solution alone and decidedly less than that of the sucrose-acid.

The aggravation of the action of acid on teeth by the presence of sucrose is of particular interest. Experiments are now under way to ascertain the action on teeth of other acid foods and beverages and the influence of various carbohydrates other than sucrose. It is also planned to determine analytically the

percentage of enamel in the molars of rats after consumption of the various solutions mentioned in this report.

The preliminary findings on puppies indicated that the drinking of sucrose-acid solutions for three weeks had a marked effect on the deciduous teeth. Gross inspection showed that the enamel on the incisors, canines and molars was more severely etched by the sucrose-acid solutions than by similar solutions containing fluorine. No destruction was observed below the gingival margin. Microscopic examination with high power magnification (×1075) and direct illumination disclosed a normal enamel surface on the teeth of puppies allowed water or sucrose solution. On the other hand, the enamel of the teeth from the two puppies given the sucrose-acid solution had a pitted appearance typical of an enamel surface after being subjected to the action of acid *in vitro*.[9] When the sucrose-acid solution contained fluoride, the tooth surface was much less affected. (Fig. 4.)

These findings on rats and puppies do not, at present, justify any definite conclusions with respect to the effects on teeth of acid beverage ingestion by man. The manner of drinking, the relative amount of saliva and its buffer capacity, and probably still other factors, in the rate at which acid drinks attack the enamel surfaces, are different in man from what they are in the animals studied. These observations may prove to be constructive in promoting research on the effects of the consumption of sweetened acid foods and drinks on human teeth.

9. Noyes, F. B., Schour, I., and Noyes, H. S.: Dental Histology and Embryology. Ed. 5. Philadelphia: Lea & Febiger, 1942, pp. 98-99.

SUMMARY

1. Severe destruction of the enamel on the molars of white rats was produced by allowing the animals to drink a popular soft beverage for periods of five days or more. With prepared solutions with the same sucrose and phosphoric acid concentration and the same pH as the commercial product, similar results were observed.

2. Preliminary observations on six puppies showed that consumption of acid drinks also produced gross and microscopic changes on their deciduous teeth.

3. The inclusion of 1 to 20 parts per million of fluorine (as sodium fluoride) in the acid beverage decreased, but did not prevent completely, the destruction of the enamel in the majority of rats studied. Within the limits tested, no apparent differences were observed in the protective action of different levels of fluorine.

4. The presence of sucrose in the acid drink aggravated the effect of the acid. The molars of rats receiving a 10 per cent sucrose-phosphoric acid solution were much more affected than those of a comparable group receiving an equal amount of saccharin-phosphoric acid solution of the same sweetness, viscosity and acidity.

THE CHANGING DENTITION OF MAN

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The dentition of man is changing in form, size and number. The general trend is toward a simplification of the patterns and a reduction in measurements of the thirty-two teeth found in early man. Studies reveal that these changes are not taking place at the same rate in the various geographic and racial groups. In order to understand their mechanism and significance, these changes must be studied from three viewpoints: genetics, development and morphology.

Geneticists have demonstrated and explained the introduction and transmission of new characters to living things. They have shown how these new qualities are brought about by mutations. In the broad sense, mutations are changes in the genes or chromosomes that give rise to new or modified characters. (Dobzhansky,[1] 1939.) They are constantly occurring with varying frequencies. The same mutations may appear in more than one place and they are then referred to as parallel mutations. These changes in genes are limited in the range and direction that they may take. Genes are currently considered to be molecules of a complicated protein nature, and, like other molecules, they can enter a chemical reaction only with certain other chemical agents that are compatible. A series of chemical substitutions in a gene may have an effect not readily paralleled elsewhere. (Shull.[2]) The change, before it can claim to be a part of the population character, must be acceptable to the organism itself, and must withstand the competition set up by the many factors in selection.

Having established itself in a given geographic group, the new character may be isolated from other groups by a number of conditions. Religious and social taboos, color of skin, stature, language and fear, as well as geographic isolation, are some of the barriers that have interfered with a free exchange of genes. These conditions vary in their isolating effect and, in proportion, determine the frequency of introduction of "foreign" genes to a population group.

In making statistical studies of the frequency of occurrence of particular genes in a given race, it is important to know whether the character is dominant or recessive. If, for example, in a random population of one hundred individuals, a certain character known to be recessive to its allelomorph was manifested in twenty-five individuals, the gene actually would be present in 75 per cent of the population. Fifty of the seventy-five persons that show the dominant character would have the recessive gene without exhibiting it. The presence of the dominant gene can always be recognized. This sort of analysis of dental characters has yet to be made. In this paper, only the frequencies of manifestation are available for study.

Data have been recorded for many of the dental characters, such as shovel-shaped incisors, anomalous cusps, occlusal surface patterns of lower and upper molars, measurements and the congenital absence of teeth.

Shovel-shaped incisors are found in varying degrees and frequencies among

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1. Dobzhansky, T.: Genetics and Origin of Species. New York: Columbia University Press, 1939; Species and Races of Living and Fossil Man. J. Phys. Anthropol., 2:251-265, September 1944.

2. Shull, A. F.: Heredity. New York: McGraw-Hill Book Co, Inc., 1938.

all races of present-day man. Such teeth are readily recognized by the extraordinary development of the lateral borders and cingulum of the lingual surfaces of the incisor crowns. The depression left in the central and incisal portions of the surface gives the impression of a shovel. As a rule, all four upper incisors are so marked. The shovel shape sometimes appears in modified form or with only a trace or suggestion of that form. For immediate purposes, only those of the the shovel-shaped character have migrated. The Hawaiian male, who represents a high percentage of white blood mixed with Mongolian, Melanesian and Polynesian, has a much lower frequency (42.9 per cent) than does the Japanese male (77.9 per cent). The American Indian has a higher frequency (67.0 per cent). The Melanesian has a percentage of 33, whereas his representative in North America, the American Negro, has been deprived of the Mongolian contact

TABLE 1.—FREQUENCY OF SHOVEL-SHAPED INCISORS*

Group	Median Incisors					Lateral Incisors				
	No. of Teeth	Shovel Shaped	Semi-Shovel Shaped	Trace	None Shovel Shaped	No. of Teeth	Shovel Shaped	Semi-Shovel Shaped	Trace	None Shovel Shaped
Chinese female	208	82.7	12.5	1.0	3.8	208	68.8	13.5	1.0	3.4
Chinese male	1,094	66.2	23.4	1.8	7.8	1,094	56.9	24.0	1.5	9.5
Japanese male	344	77.9	18.0	—	4.0	344	72.7	20.3	—	4.0
Indian	277	67.0	24	9.0	2.0	300	76.0	17.0	6.0	1.0
Mongolian	24	62.5	29	8.5	—	24	75.0	28.0	—	—
Hawaiian male	42	42.9	38.1	4.8	14.3	42	57.1	14.3	4.8	14.3
Hawaiian female	76	36.8	44.7	7.8	10.5	76	39.5	38.2	6.6	2.6
Eskimo	40	37.5	47.5	15.0	—	37	57.0	43.0	—	—
Melanesian	6	33.0	33	—	33.0	6	6.7	—	33.0	—
American Negro, male	618	4.9	7.6	33.0	54.5	618	4.5	12.8	38.0	42.1
American Negro, female	1,000	3.6	8.0	32.6	56.0	1,000	3.8	11.1	35.1	47.5
White male	1,000	1.4	7.6	24.5	66.5	1,000	1.4	8.8	36.4	50.0
White female	1,000	2.6	5.2	21.8	70.4	1,000	1.0	7.4	29.9	59.6

*Hrdlicka, Ales: Shovel-Shaped Teeth, Am. J. Phys. Anthropol., 3:429-465, 1920.

definite shovel shape will be included. Hrdlicka[3] presented a comprehensive study of the shovel-shaped incisor as it occurs in present-day man. (Table 1.) His work shows a very high percentage (82.7) for the Chinese female and a very low percentage (1.4) for the white male. The focal point for this character is definitely in China; and the farther away one goes from China, the lower the frequency percentage becomes. This shows the extent to which the genes bearing except with the American Indian and presents only 4.2 per cent. The white male has the lowest, only 1.4 per cent. These percentages are in reference to characters actually present; they do not indicate the true frequency of genes in the groups included. Only after the manner of inheritance and other possible modifying conditions are determined can the gene frequency be established. For the time being, these figures are significant in showing relatively how the isolation factors have operated in regard to the shovel-shaped incisor.

There are several occlusal surface pat-

3. Hrdlicka, Ales: Further Studies on Tooth Morphology. Am. J. Phys. Anthropol., 4:141-176, 1921.

terns on lower molars, study of which shows decidedly different incidences of occurrence of the patterns in population groups. The fundamental lower molar occlusal pattern can be described as five cusps of which three are located buccally from the two others, and their relationship is such that the grooves found between them converge to resemble the letter Y when viewed from the lingual aspect. (Figs. 1 and 2.) This pattern is the one seen commonly on the lower first molars of man, and on all the lower molars teroposteriorly, and 2 and 4 for the lingual or inner cusps in the same direction. The grooves formed by cusps 1, 3 and 5 converge toward the lingual aspect to meet the groove separating cusps 2 and 4. The Y formation of grooves is changed in some lower molars to a + (plus) formation when the sizes or proportions of the individual cusps are changed. It will be noted in Figure 1 that the first molar has cusps 2 and 3 in contact, whereas the third molar has cusps 1 and 4 in contact. The latter relationship has been

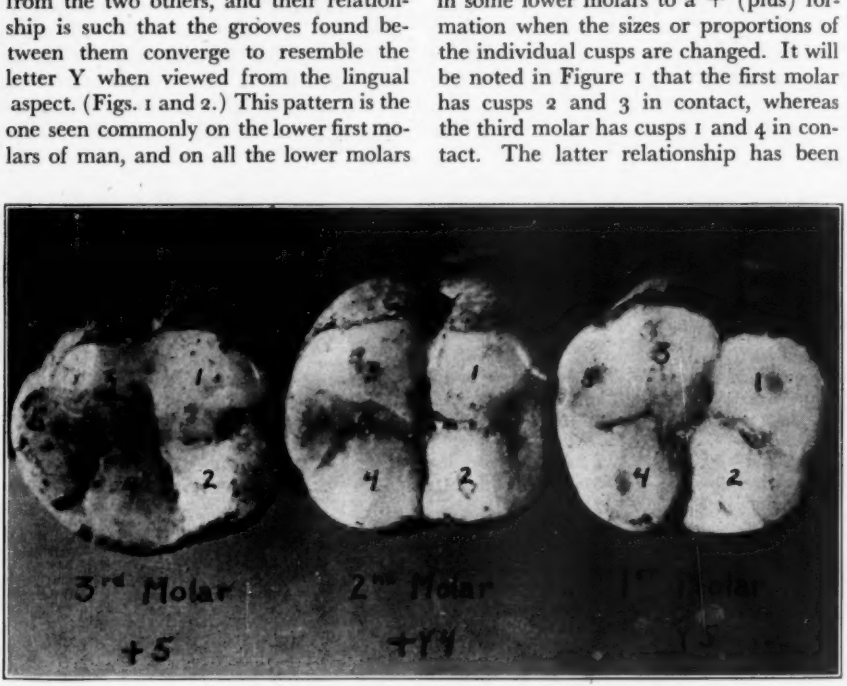

Fig. 1.—Lower molars; showing cusp numbers and patterns.

of the anthropoid fossil *Dryopithecus,* after which it has been named. To be more explicit and to emphasize the significance of the relationships of the cusps, a fuller description of this and other patterns of lower molars is necessary. Gregory and Hellman,[4] in the interests of simplicity and expediency, suggested that the cusps of the lower molars be designated by numbers; namely, 1, 3 and 5 for the buccal or outer cusps and described as the + pattern. In some molars, the distal cusp (cusp 5) is absent. Reference is made to the number of cusps on the tooth by combining the numeral 4 or 5, whichever happens to be the case, with the + or Y. Lower molars with five cusps are therefore spoken of as Y5 or +5 and those with four cusps as having a Y4 or +4 pattern. Hellman[5] made a study of these patterns and differentiated between Y4 and +4. A similar study that I made of some

4. Gregory, W. K., and Hellman, Milo: Dentition of Dryopithecus and Origin of Man. Anthropological Papers of American Museum of Natural History, Vol. 27, Part 1, 1926.

5. Hellman, Milo: Racial Characters in Human Dentition. Proc. Am. Philos. Soc., 67:157-174, February 1929.

thousand mandibles revealed a number of jaws having a Y4 molar on one side with a +4 pattern on the corresponding molar on the other side. These differences are probably due to environmental conditions not called for in the genic makeup. Hence, for the purposes of this paper, all the four cusped patterns will be considered in one group as +Y4. The Y5 and +5 patterns are separate entities without question and can be assumed to be separate hereditary manifestations.

According to Gregory and Hellman,[4] tations have been attempted on the basis of the position that various races or peoples have in the evolutionary scale. The significant point is that more hereditary influences for certain characters are operating in some populations than in others. The Australian Aboriginals are the least advanced when the patterns of the molars are considered because they have a higher incidence of five-cusped patterns than do the other geographic groups.

The data compiled on patterns of lower molars show that 100 per cent of

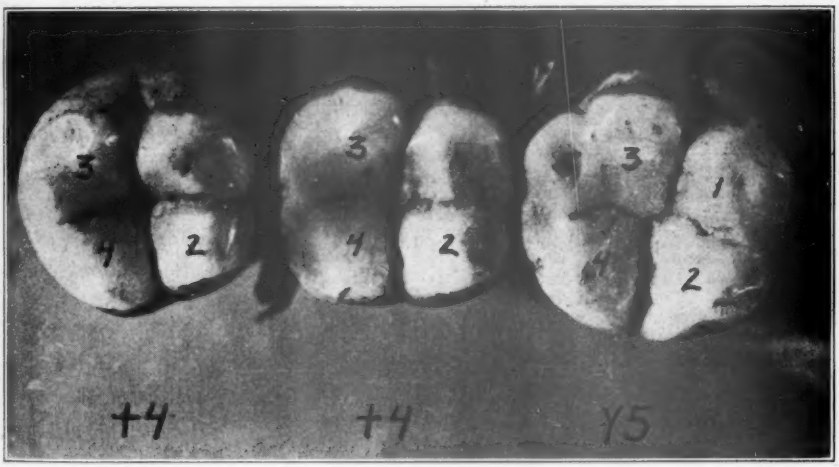

Fig. 2.—Lower molars; showing cusp numbers and patterns.

the Y5 pattern is found on nearly all of the lower permanent molars of prehistoric man. During the course of time, since these men first inhabited the earth, there have been changes in these teeth. Few individuals can be found among present-day man who have five cusps arranged in the Y pattern on all the lower molars. The predominating patterns found today are the Y5 for the first molar and the +4 for the second and third molars, although all three patterns are to be found in varying frequency in all the lower molars. (Tables 2, 3 and 4.) Interpre- the American Indians, Australian Aboriginals, Asiatic Mongols and Chinese have the Y5 pattern on the first molar. (Table 2.) The West African Negroes have a frequency percentage of 99, the American Negroes 98, the Eskimos 97, the Melanesians 92, the American white males 87, the Ancient European whites 83 and a particular group of American white children 74. The four-cusped type appears in the first molar most frequently in Ancient European whites (17 per cent). The American white children group has this character in 13 per cent

of the mandibular first molars, the American white males in 11 per cent, the Melanesians in 4 per cent, the American Negroes and West African Negroes in 1 per cent and the Chinese, Eskimos, Australian Aboriginals, American Indians and Asiatic Mongols none at all. The +5 pattern occurs in the lower first molars in somewhat the same distribution as the +Y4 except for the three white groups.

The second and third lower molars show a much greater change in the pattern incidence of the groups studied.

In the second molar, 99 per cent of American white males have the four-cusped pattern, which occurs in second molars in 87.5 per cent of Melanesians, 86 per cent of Ancient European whites, 81 per cent of Chinese, 75 per cent of West African Negroes, 70 per cent of American Negroes, 69 per cent of Asiatic Mongols and American Indians, 57 per cent of Eskimos and 52 per cent of Australian Aboriginals. The Y5 pattern is retained in the second molars in 17 per cent of the West African Negroes, 6 per cent of American Negroes and Eskimos, 5 per cent of the Australian Aboriginals, 2 per cent of the Ancient European whites, 1 per cent of the American Indians and 0.5 per cent of the Melanesians. The +5 pattern is considered as an intermediate step between the Y5 and the four-cusped patterns in the evolution of molars. In the second molars, the incidence of the +5 pattern is found in reverse order from that of the four-cusped tooth, with the Australian Aboriginals again heading the list with 43 per cent.

Passing on to the third molar, we find that approximately the same progression of population groups exists in regard to the incidence of the four-cusped pattern as in the second molar. (Table 4.) The actual percentage figures change as a group in favor of the +5 pattern, but the ratios are roughly the same. In a number of instances, the form of the third molar is so variable that it cannot be classified. This tooth cannot, like the first and second molars, be said to have a typical pattern.

From these statistics, it can be inferred that, whatever it is, the hereditary mechanism that is calling for changes in the lower molars is modifying them all, but not in the same degree. The first molar is the least affected and the third the most.

The distolingual cusp (hypocone) of maxillary molars is absent in some individuals. Here again, it is found that in some groups this cusp is missing more

TABLE 2.—PERCENTAGE DISTRIBUTION OF PATTERNS ON LOWER FIRST MOLARS*

Population Group	No.	Y5	+5	+Y4
Chinese	26	100	..	..
Australian Aboriginal	18	100	..	..
American Indian	97	100	..	..
Asiatic Mongol	36	100	..	..
West African Negro	97	99	..	1
American Negro	179	98	1	1
Eskimo	29	97	3	..
Melanesian	237	92	4	4
American white male	98	87	2	11
Ancient European white	54	83	..	17
American white child	164	74	13	13

*All figures with the exception of those of the Melanesians are adapted from Hellman (1928).

TABLE 3.—PERCENTAGE DISTRIBUTION OF PATTERNS ON LOWER SECOND MOLARS*

Population Group	No.	Y5	+5	+Y4
American white male	110	..	1	99.0
Melanesians	194	0.5	12	87.5
Ancient European white	54	2.0	11	86.0
Chinese	21	..	19	81.0
West African Negro	96	17.0	8	75.0
American Negro	218	6.0	24	70.0
Asiatic Mongol	39	..	31	69.0
American Indian	99	1.0	31	69.0
Eskimo	30	6.0	37	57.0
Australian Aboriginal	21	5.0	43	52.0

*All figures with the exception of those of the Melanesians are adapted from Hellman (1928).

often than in others. (Table 5; Fig. 3.) Melanesians have a very sturdy dentition and present four well-developed cusps on 98 per cent of the upper first molars studied. The other 2 per cent have the four cusps present, but the distolingual cusp is smaller than usual. This cusp is missing in 2 per cent of the first molars of American whites and in 5 per cent of the Eskimos. Absence of the distolingual cusp is much more common in the second molar. Frequency percentage of this character loss in the second molar is 13 for the Melanesians, 42 for the American whites and 68 for the Eskimos. This characteristic is even more accentuated in the third molar, wherein the Melanesian has this cusp missing in 40 per cent, the American whites in 55 per cent and the Eskimo in 82 per cent. In all three of the population groups, the third molar most commonly has a missing distolingual cusp. This is the tendency that was noted in regard to the incidence of pattern change in the lower molars.

TABLE 4.—PERCENTAGE DISTRIBUTION OF PATTERNS ON LOWER THIRD MOLARS*

Population Group	No.	Y5	+5	+Y4
American white male	74	4	34	62
Melanesian	164	11	64	19
Ancient European white	35	6	34	60
Chinese	16	..	50	50
West African Negro	88	20	59	20
American Negro	187	4	63	33
Asiatic Mongol	31	..	77	23
American Indian	84	..	75	24
Eskimo	29	..	52	48
Australian Aboriginal	23	14	72	14

*All figures with the exception of those of the Melanesians are adapted from Hellman (1928).

An extra cusp (C6) along the distal margin of the occlusal surfaces of the lower molars occurs quite frequently in the Australian Aboriginal. (Table 6; Fig. 4.) It has a high frequency also in the American Indians and Eskimos. The anomaly is found less frequently in the American and West African Negroes, Melanesians and Asiatic Mongols. In the Chinese, Ancient European whites, and American white males, it rarely occurs.

Another anomalous cusp known as the seventh cusp (C7), located between the two lingual cusps of lower molars, is found in certain individuals. (Table 6; Fig. 5.) This character occurs most frequently in American Negroes; less often in West African Negroes and then, in the order of decreasing frequency, in Asiatic Mongols, Melanesians, Australian Aboriginals, American Indians, Chinese and whites. The Eskimo does not show the seventh cusp in any of the three molars.

TABLE 5.—PERCENTAGE DISTRIBUTION OF MAXILLARY MOLAR PATTERNS OF MELANESIANS, AMERICAN WHITES AND ESKIMOS*

	Maxillary First Molars			
Group	No.	4	4—	3
Melanesian	266	98	2	..
American white	106	95	3	2
Eskimo	38	90	5	5
	Maxillary Second Molars			
	No.	4	4—	3
Melanesian	216	50	37	13
American white	92	38	20	42
Eskimo	29	14	17	68
	Maxillary Third Molars			
	No.	4	4—	3
Melanesian	164	14	44	40
American white	83	21	24	55
Eskimo	11	18	..	82

*4 designates four well-developed cusps; 4— indicates a reduction in the size of the distolingual cusp; 3 indicates total absence of the distolingual cusp.

Dietz[6] has shown that the accessory Carabelli cusp on the lingual surface is more commonly found on the first maxillary molar and less often on the second molar. (Gregory[7] and Weiden-

6. Deitz, V. H.: Common Dental Morphotropic Factor, Carabelli Cusp. J.A.D.A., 31: 784-789, June 1, 1944.

7. Gregory, W. K.: Origin and Evolution of Human Dentition. Baltimore: Williams and Wilkins Co., 1922.

reich.[8]) The paramolar cusp of Bolk,[9] which is found occasionally on the mesial portion of the buccal surface of lower molars, occurs but rarely on the first molar, more often on the second and third. (Dahlberg.[10])

Measurements of teeth have been made by numerous investigators. The most significant index to tooth size is the crown module, which is half the product of the length and the breadth of a tooth.

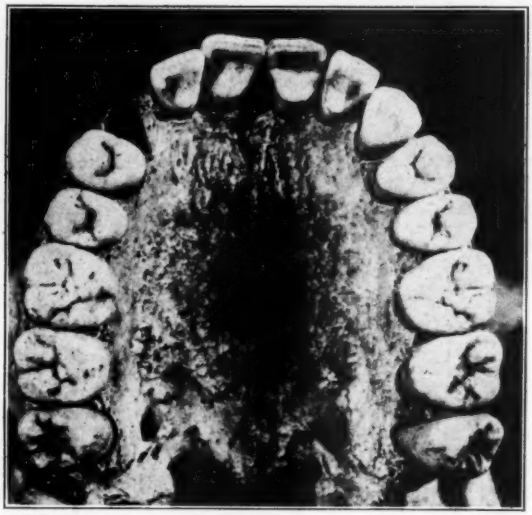

Fig. 3.—Modifications of distolingual cusp on second and third upper molars.

$$\text{(Crown module} = \frac{\text{length} \times \text{breadth)}}{2}.$$

(Table 7.) On the basis of these computations, the Australian Aboriginal has the largest molars. Other population groups have varying crown modules, down to the Bush Negro, who has the smallest.

It has been apparent throughout this study of patterns, anomalies and measurements that each character has a varying representation in the different population groups. Another feature of the human dentition is the fairly high incidence of missing lateral incisors, second bicuspids and third molars. Not only are they missing frequently, but also abnormalities of form are almost always expressed in these particular teeth, and very rarely in the central incisor, cuspid, first bicuspid and first molar.

These facts recall the distribution of the patterns of the molars and how the first molar retained the primitive form with a high frequency in all groups. The second molar was more variable and the third molar the most. This range of variability is also substantiated by comparison of statistical studies of tooth measurements. Table 8 shows that the coefficient of variability increases in Melanesians from first to second to third

8. Weidenreich, F.: Dentition of Sinanthropus Pekinensis: Comparative Odontography of Hominids. Palaeontol. Sinica, No. 1, 1937.

9. Bolk, L.: Problems of Human Dentition. Am. J. Anat., 19:91-148, January 1916.

10. Dahlberg, A. A.: Paramolar Tubercle (Bolk). J. Phys. Anthropol., 3:97-103, March 1945.

molars. Stein[11] also showed this in his studies.

Congenital absence of the first molar is extremely rare. This is also the fact for the second molars. The third molars have been reported missing in as many as 49 per cent of individuals in Hungary. (Hellman.[12]) (Table 9.) Lower percentages are found for other population groups, ranging down the scale through the Chinese, Eskimos, Buriats, Hawaiians, American Indians, Australian Aboriginals, American Negroes, Melanesians, Ancient Egyptians and the West African Negroes, with a low of 2.6 per cent.

Absence and degeneration of the lateral incisor teeth are not so common as absence of the third molars. Australian Aboriginals, African Negroes (Bantu) and Melanesians are particularly free of this deficiency. In the various popula-

TABLE 6.—PERCENTAGE DISTRIBUTION OF SIXTH AND SEVENTH CUSPS ON LOWER MOLARS*

Tooth Group	Sixth Cusp M1	M2	M3	Seventh Cusp M1	M2	M3
Australian Aboriginal	8	43	54	..	..	7
American Indian	6	16	32	..	..	6
Eskimo	1	20	28	..	..	..
American Negro	2	8	33	22	4.0	6
West African Negro	3	6	16	12	5.0	6
Melanesian	9	5	9	6	1.5	3
Asiatic Mongol	..	15	29	11	..	6
Chinese	..	..	..	..	5.0	..
Ancient European white	..	2	3	2	..	..
American white male	..	..	3	3	2.0	..

*All figures except those of the Melanesians are from Hellman (1928).

TABLE 7.—CROWN MODULES* OF LOWER MOLARS

Group—Source	M1	M2	M3
Australian (Campbell)	12.10	12.10	11.5
Australian (Klaatoch)	11.55	12.00	
Melanesian (Stein)	11.50	10.90	10.95
Melanesian (Dahlberg)	11.35	10.80	11.00
Caledonian (Topinard)	11.15	10.80	
Eskimo (Hrdlicka)	11.05	10.80	
Chinese (Virchow)	11.30	10.80	
Indian (Hrdlicka)	11.05	10.65	
Bantu (Shaw)	10.75	10.65	10.75
American Negro (Hrdlicka)	10.90	10.65	
American white (Stein)	10.88	10.40	10.35
American white (Black)	10.75	10.40	10.25
Bush Negro (Drennan)	10.55	10.35	9.75

*$\frac{\text{Length} \times \text{Breadth of Tooth}}{2}$

TABLE 8.—COEFFICIENTS OF VARIABILITY* IN SIZE OF MOLAR TEETH OF NEW BRITAIN MELANESIANS

Maxillary Teeth

	M1		M2		M3	
	Length (253)†	Breadth (210)	Length (211)	Breadth (233)	Length (156)	Breadth (157)
Coefficient of V	5.7	4.8	6.1	5.6	7.2	6.3

Mandibular Teeth

	M1		M2		M3	
	Length (219)	Breadth (222)	Length (179)	Breadth (198)	Length (169)	Breadth (166)
Coefficient of V	4.9	4.8	6.4	5.6	6.9	6.4

*A low numerical value for the coefficient of variability (V) indicates a lower range of variation about the mean for a given character or measurement. $V = \frac{100\sigma}{M}$

†The number following words length and breadth indicates number of teeth measured.

11. Stein, M. R.: Molar Teeth of New Britain Melanesians. J.A.D.A., 21:1409, August 1934.

12. Hellman, Milo: Wisdom Teeth in Lower Jaw. Arch. Clin. Oral Path., 4:171-186, September-December 1940.

tions of man, the percentage reaches a high of 7.8. Other groups have percentages below this figure. (Tables 10 and 11.) Frequently, it is found that absence or peg shaping of the lateral incisor is accompanied by absence of one or more third molars. The second bicuspid is also sometimes missing in conjunction with absence of other teeth.

TABLE 9.—PERCENTAGE DISTRIBUTION OF MISSING THIRD MOLARS

Group	Author	No. of Jaws	Per Cent Lacking One or More M3
European white	Hellman (1928)	61	20.0
European white (Hungary)	Hellman (1940)	?	49.0
European white	Golbirsch (1930)	2,112	10.3
Chinese	Hellman (1928)	19	32.0
American Indian	Hellman (1928)	55	13.0
Eskimo	Hellman (1928)	30	28.0
Eskimo	Goldstein (1932)	759	26.6
Eskimo	Dahlberg (1945)	37	29.0
Hawaiian	Chappel (1927)	138	15.9
Hawaiian	Dahlberg (1945)	25	24.0
Mongols (Buriat)	Hellman (1928)	21	17.0
Australian Aboriginal	Hellman (1928)	20	13.0
American Negro	Hellman (1928)	119	11.0
Melanesian	Dahlberg (1945)	165	4.0
Ancient Egyptian	Ruffer (1920)	156	3.2
West African Negro	Hellman (1928)	49	0.0
West African Negro	Hellman (1940)	?	2.6
American white	Banks (1934)	461	19.7

(Dahlberg,[13] Brekhus, Oliver and Montelius.[14]) This emphasizes the point made previously that certain teeth in the dentition are more vulnerable to change than others.

13. Dahlberg, A. A.: Inherited Congenital Absence of Six Incisors, Deciduous and Permanent. J. D. Res., 16:59, February 1937.

14. Brekhus, P. J.; Oliver, C. P., and Montelius, George: Study of Pattern and Combination of Congenitally Missing Teeth in Man. J. D. Res., 23:117, April 1944.

COMMENT

From the foregoing studies of size, patterns, anomalies and number of teeth, the conclusions to be drawn are, first, that the gene frequencies influencing dental characters vary definitely from one population group to another and, second, that there are certain points in the dentition that respond more readily to change than others, whatever the source may be.

TABLE 10.—PERCENTAGE DISTRIBUTION OF MISSING AND DEGENERATE LATERAL INCISORS*

Group	Missing Per Cent	Degenerate Per Cent	Both Per Cent
Modern white	2.5	2.5	5
Chinese			2
Japanese			4
Negroes (pure)			1.5
Mixed blood Negro			5.0
Australian Aboriginal			..
Bantu			..
Melanesian			..

*Ashley-Montagu, M. F.: Significance of Variability of Upper Lateral Incisor Teeth in Man. Human Biol., 12:323, September 1940.

TABLE 11.—PERCENTAGE DISTRIBUTION OF MISSING AND DEGENERATE LATERAL INCISORS*

Group	Missing Per Cent	Degenerate Per Cent	Both Per Cent
Chinese	0.15	7.7	7.8
Japanese	1.10	4.7	6.0
Hawaiian	1.70	1.7	3.4
American Negro	2.00	3.7	5.7
White	3.20	3.1	5.2

*Hrdlicka, 1921.

The fact that these variations do exist brings up Weidenreich's[8] contention that variations in dentition, if they really occur, must be confined to such alterations as are "without significance to the course of evolution." His statements are based on the thesis that the impelling force restricting certain changes in man is contained in the enlargement of the brain (brain case). To quote Weidenreich farther:

The transformation of the entire facial skeleton is associated with the development of the brain case but in reverse directions. The brain case tends to enlarge and to seize more and more, so to say, the region occupied by the facial skeleton. The latter loses its dominant position and finally appears as a relatively insignificant appendix to the now dominant brain case. Hence, the reduction and transformation of the dentition is a part of and a correlative reaction in the process of alteration affecting the entire skull.

Thus, he infers, on the basis of his vast studies of fossil man and evolution, that the genetic factor calling for one change in the brain case also calls for certain definite others, among which are those in the teeth. Weidenreich does not deny that variations occur in man's dentition, but he does say that these changes are limited.

Wright and Wagner[15] demonstrated a correlation of abnormal changes in jaws and jaw musculature with modifications in the form and relations of many of the bones of the skull of guinea-pigs having a hereditary basis for this alteration. The modifications also included a decrease in the number of teeth present and a definite change in the form of those remaining. In the more severe phases of the condition, the teeth as well as the jaws did not develop at all. Wright and Wagner attribute these associated phenomena to correlative influences, largely mechanical, not to direct gene action. They say, "The case illustrates the extent to which morphological changes of an apparently qualitative sort may be brought about as a result of ramifying correlative effects from initial gene affects of a simple quantitative sort." Although the hereditary factors called for certain modifications in the skull bones, secondary effects were reflected in the jaws and teeth. From this, it can be seen how a correlation might exist between the teeth and the factors in the skull size. Geneticists would be averse to placing restrictions on variations in teeth without considerably more evidence.

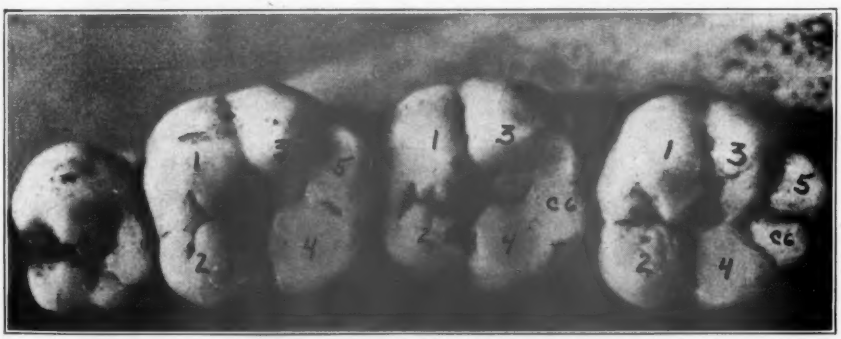

Fig. 4.—Lower molars; showing sixth cusp (C6).

It must be admitted that the variations discussed in this paper are real, but still not too divergent from the general trends of evolution of the human teeth toward a simplification in form and number. A further description of this process,

15. Wright, S., and Wagner, K.: Types of Subnormal Development of Head from Inbred Strains of Guinea Pigs and Their Bearing on Classification and Interpretation of Vertebrate Monsters. Am. J. Anat., 54:383, May 15, 1934; Wright, S.: Genetics of Subnormal Development of Head (Octocephaly) in Guinea Pig. Genetics, 19:471-505, November 1934.

termed secondary polymerism, has been given by Cope,[16] Gregory[17] and Stein.[18] How this simplification is taking place is an open question. A definite clue is suggested by the previously made observation that certain points in the human dentition are more susceptible to change than are others. Whether the results are from initial gene action or are a response to other not immediately discernible correlative conditions brought about by influences of different genes cannot be definitely stated. The latter is the more likely.

shown that these three teeth are more frequently missing than the other members of the series; that they are more vulnerable to changes in pattern, and that they have larger coefficients of variability in size.

There must be some significance to this selectivity. The extreme rarity of the anomalies and variations on the other teeth rule out the element of chance environmental, mutant or accidental aberrations. Ashley-Montagu's theory that maxillary-premaxillary suture line disturbances account for anom-

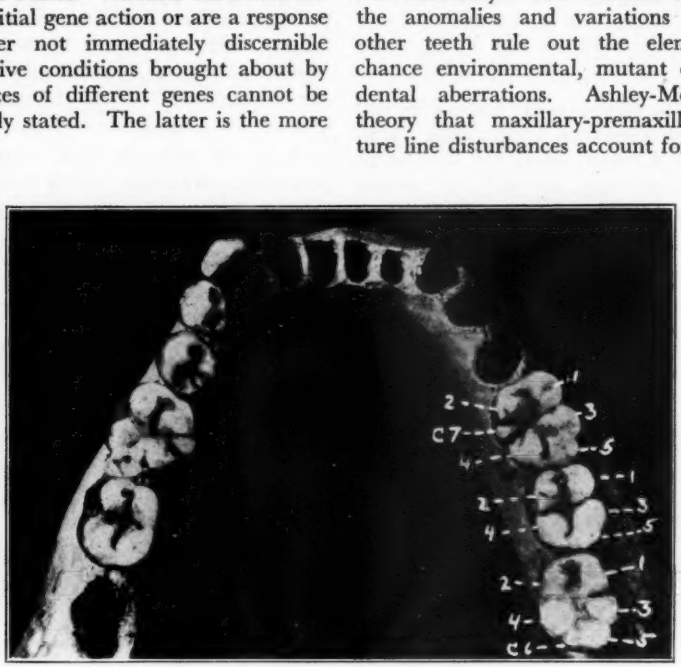

Fig. 5.—Lower molars; showing seventh cusp(C7).

Nevertheless, changes, when they do occur, are most frequently manifested in the upper lateral incisors, the second bicuspids and the third molars. It was

alies of form and absence of the lateral incisors might hold for some instances, but certainly not for all. Such an explanation would not be valid for the second premolar and the third molar. The order in which the teeth differentiate rules out any association of variation with the stage of development of the entire dentition. On the other hand, the obvious fact remains that the anomalies are related specifically to the tooth districts rather than to the dentition as a whole.

16. Cope, E. D.: Method of Creation of Organic Form. Proc. Am. Philos. Soc., 12: 229-263, 1871.

17. Gregory, W. K.: Half Century of Trituberculy, Cope-Osborn Theory of Dental Evolution. Proc. Am. Philos. Soc., 73:290-294, April 1934.

18. Stein, M. R.: Some Variations of Upper Third Molar. J.A.D.A., 21:1815, October 1934; Polyisomerism of Human Dentition. J. D. Res., 14:125, April 1934.

Butler,[18a] in his studies of the dentition of the fossil Cenozoic mammals, applied what is known as the field concept of development to the problem of morphodifferentiation of teeth. He pointed out that tooth characters are manifested to a maximum degree in certain key teeth in each of the incisor, canine and molar groups. Proceeding from tooth to tooth, away from the key member, reveals a decreasing prominence for the characters. (Fig. 6.) Butler contended that a field of influence governing size and form exists in each tooth group. These fields are strong at certain points, less so at their extremities.

The field concept is a theory of development embodying an abstract visual representation of the organizing factors in the process of development of living things; that is to say, the factors in form and character of limbs, eyes, ears, heart, lung, teeth, etc. A field may be defined loosely as a sphere of influence. It manifests itself in decreasing strength as the distance is increased from a hypothetical pole located within the field. It might be compared to a magnetic field the effects of which can be studied with iron filings and such, but which itself is not tangible. Fields have definite properties and limitations. There is, for example, the time element, when they begin their existence, when they become active and when they cease to exist. It is not pertinent at this time to discuss all of them. That such fields exist has been proved by experiments in lower animals. That these fields have a polarity and varying influences has also been shown. (Huxley and De Beer,[19] Weiss,[20] Willier and Rawles,[21] Hunt,[22] Rawles,[23] Rudnick,[24] Stein.[25]) An example of one type of influence regulating tissue growth can readily be recognized from the results obtained when enamel-forming tissue (ameloblasts, etc.) is transplanted. The ameloblasts degenerate and cease functioning in the absence of dentin and dentin-forming tissues, or, more specifically, in the absence of whatever influences these tissues exert.

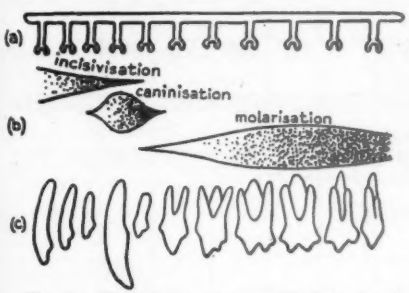

Fig. 6.—Field concept as applied to dentition. (Butler, 1939.)

A word of caution is necessary here to avoid a too literal acceptance of such a representation, without due regard to other correlative developmental and environmental conditions that may alter the end-results of the processes initiated by the genes. With this in mind, Figure 7 was prepared, in an attempt to interpret the characters of the permanent human dentition that have been discussed in this paper by the application of a modification of the field concept. The vertical lines designate the divisions of one of the four quadrants of dentition (central incisor, lateral incisor, cuspid, etc.). The horizontal

18a. Butler, P. M.: Studies of Mammalian Dentition. Differentiation of Post-Canine Dentition. Proc. Zool. Soc., London 109:1-36, 1939.

19. Huxley, J. S., and DeBeer, G. R.: Elements of Experimental Embryology. New York: Macmillan Co., 1934.

20. Weiss, P.: Principles of Development. New York: Henry Holt and Co., 1939.

21. Willier, B. H., and Rawles, M. E.: Proc. Soc. Exper. Biol. 32:1293, May 1935.

22. Hunt, T. E.: Anat. Rec., 55:41, January 1932.

23. Rawles, M. E.: J. Exper. Zool., 72:271, January 1936.

24. Rudnick, D.: J. Exper. Zool., 71:83, July 1935.

25. Stein, K. F.: Physiol. Zool., 6:205, 1933.

bands represent the various tooth characters. Some of these are limited to one region; others include the entire dentition; while others not represented here might span two or three regions. The darkest areas of stippling indicate the position in the dentition wherein the particular character is most manifest. Band 1 represents the factors in the general differentiation of teeth. Here, the primary structures, such as enamel and dentin, are included. These do not vary from tooth to tooth, and this group as well as those of bands 2 and 5, which represent general size and form, demonstrate the influences equally from incisor to third molar. For example, hereditary opalescence of dentin,[26] a change in the dentin character, is found throughout the dentition. It is not selective for any particular tooth or region. Size and form are in a general way uniformly imposed on a particular set of teeth. They are, as a rule, either all small, all large or at some stage in between, all angular and rugged, or all smooth and rounded. Band 3 is merely a division of the quad-

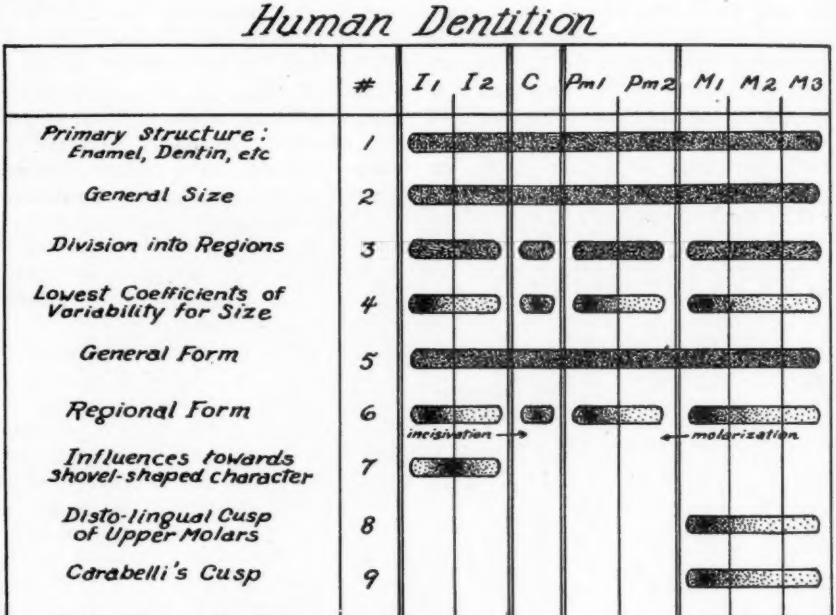

Fig. 7.—Attempt to apply field concept to certain characters of human dentition.

26. Hodge, H. C., et al.: Hereditary Opalescent Dentin. J.A.D.A., 26:1663, October 1939.

rant into its components: incisors, cuspid, bicuspids and molars. The teeth with the lowest coefficients of variability in each region would be assumed to be nearest the pole (band 4). The cuspid stands alone in its own field as shown here, but further investigations may include the bicuspids along with the cuspid for the purposes of this sort of study. (Black,[27] Wheeler,[28] Stein.[11, 18]) On the same basis, tooth form variations place the poles in band 6 at the teeth least variable in pattern. Individual group characterizations and anomalies such as the Carabelli cusp, the distolingual cusp of upper molars and the seventh cusp on lower molars occur most frequently and prominently on first molars and rather infrequently and greatly diminished on the third molars (bands 8, 9 and 11). Exactly the reverse is true of Bolk's paramolar cusp and the sixth cusp of lower molars (bands 10 and 12). Here, the frequency and degree of development are least in the first molars. The shovel shape in most manifest in the central incisor (band).

It must be emphasized that this theory of dentition is not complete. Much work and thought are yet required. It is known that correlative or modifying influences come into action at varying times with varying effects. Timing is an important factor in the activities of fields. These correlative influences may at times become active at critical points in the differentiation of particular tooth germ groups. They might have a suppressing effect on the fields, and these influences may increase or decrease in ratio with time. The appearance of supernumerary teeth while the field is still in full force would result in fully formed teeth of the type of those in whose region they occurred. If the field activity had ceased or been greatly altered, the result would be the commonly recognized simple cone or a modification thereof. The fields are, very likely, at their peak when the first tooth of each group is differentiating. In some instances, the influences might later be reduced enough to cause modifications in the distal members of the particular district or districts, such as peg shaping, reduced pattern or size or even complete absence. These correlative influences can be inherited just as well as a direct gene action, and they make it doubly important to seek out and record other facts that do not seem related at the time that individuals with hereditary dental anomalies are examined.

The scheme as applied here, although highly conjectural, does supply an orderliness and a very likely explanation to a hitherto unrelated group of facts. The fields represented in Figure 7 are only inferential, derived from statistical studies of morphologic changes. Experiments have been performed in the past by Huggins, McCarroll and Dahlberg,[29] Glasstone[30] and Hahn[31] on the transplantation of tooth germ elements to the abdominal wall and other sites. Observations of the development and changes of the individual dental tissues were recorded. Sufficient time was not taken to make observations on the possible variations of tooth form. Experimental transplantation of differentiating and differentiated tissues within the dental arches will be necessary in order to learn more of the characteristics of the

27. Black, G. V.: Descriptive Anatomy of Human Teeth. Ed. 5. Philadelphia: S. S. White Dental Manufacturing Co., 1902.

28. Wheeler, R. C.: Textbook of Dental Anatomy and Physiology. Philadelphia: W. B. Saunders, 1940.

29. Huggins, C. B.; McCarroll, H. R., and Dahlberg, A. A.: Transplantation of Tooth Germ Elements and Experimental Heterotopic Formation of Dentin and Enamel. J. Exper. Med., 60:199-210, August 1934.

30. Glasstone, S.: J. Anat., 70:260, January 1936; Proc. Roy. Soc., 126:315, January 1938.

31. Hahn, W. E.: Capacity of Developing Tooth Germ Elements for Self-Differentiation When Transplanted. J. D. Res., 20:5, February 1941.

fields regulating tooth development.[32]

This paper has dealt with the changes that are occurring in the teeth of man. The changes are present and inheritable. They occur in varying ratios in different populations. The general trend of tooth character is toward a reduction in size, form and number. The field concept and the fact that morphogenetic fields may be affected by correlative influences from other genes, directly or indirectly, offer a working basis for an attempt to explain the mechanism of change in man's dentition. Studies of the morphology and genetics of human dentition should be made with this in mind.

CAN RESEARCH IN DENTISTRY BE IMPROVED THROUGH PREABSTRACTING SERVICE?

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Most of us who follow the literature in an effort to keep abreast of the new research that is reported are impressed sooner or later by the fact that many of these studies could have been greatly improved if each had been conducted cooperatively with some other study. The term "preabstracting," as it is used in this article, refers to the publication of research plans before the research itself has been fully undertaken. It is the purpose here to demonstrate how a preabstracting service might function to facilitate and improve research in dentistry.

We are all indebted to the men who have kept us informed about completed research. The original articles describing the studies, the abstracts that have summarized the original articles and finally the lists of current dissertation titles have all been helpful. While the various kinds of news notes have made us aware of some research that was being conducted, many of us have felt for some time that a new service, a "preabstracting" service, was needed. Such a service could be carried on by a professional journal for its own particular field, or it might be a journal in itself, covering possibly a larger area of interests. It might also be a release prepared by a library whose interest is in a single field. Where abstracting sections now present a brief account of research that has been completed, preabstracts would include an account of research that was about to be started or had recently been initiated. Preabstracts would of necessity be lengthier and bulkier than the usual abstracts. Whereas an abstract refers the reader to a full account that he may consult if interested, the preabstract is the only existing printed account of proposed research. Therefore, it must convey enough information about the research problem and the design of the experiment to enable the reader to tell whether the project is of interest to him.

The men of dentistry probably realize better than those in any of the other professions that research is not limited to the college professor or the man in the commercial laboratory. It is true that many practicing dentists get relatively little time to delve into any big, long-time research problems, but this does not mean that they are not vitally interested in the discoveries already made. Not only that, but they would all be interested in being kept posted on re-

32. Bateson, William: Materials for Study of Variations. New York: Macmillan & Co., 1894.

search that is proposed and research that is in progress. There is probably not a single dentist who has not at one time or another had a number of valuable ideas about developments in his own special field. Ideas that would have helped the man in the research laboratory. Ideas that perhaps only a practicing dentist or a dentist with his own special experience could have had.

Visualize the tremendous potential benefit to research that is therefore available. Visualize how wasteful duplication of effort would be minimized by the announcement of research at the time that it was started. Probably every man in dentistry has come across ideas and methods that would be invaluable in the studies which are now in progress. We recognize that most of these men do not have the time, the assistants or perhaps the laboratory facilities for conducting some of this research, and many of the ideas would serve best as that certain hunch or clue which is needed to weld together a long train of thoughts and experiments. Why not tap this reserve of ideas? Why not let those who will, cooperate by giving their suggestions and telling of their experiences? This can only be done by letting these men with ideas know what the men with research facilities are planning to do. This could be done by a preabstracting service.

Let us imagine how such a service might function. A certain member of the faculty of a midwestern dental school might be planning research on the prevention of caries by the inclusion of certain minerals in the food and drinking water. He would, of course, be familiar with his problem and would know what previous work had been done in this field and its implications to his own proposed study. We must also assume that he has set up his statement of the problem; has defined and delimited his goals, and immediate aims; has decided on a design for his experiment that, in most types of experimentation, would contain both experimental and control factors, and has decided on the types of statistical analyses that he expects to use on the gathered data.

The person in charge of the preabstracting section of the journal would have contacted him and would have obtained a rather detailed account of the research problem and his plan of attack. This account would be published in the preabstracting section, where it could be read by every one. People with all sorts of interests would read about this research and many would find that they had something to offer. A practicing dentist in an eastern community might write to tell the researcher a group of people in his town would be interested in acting as a control group. A physician in the south might offer assistance by turning over data that he had collected, but had never published, on the same topic. A dental professor on the Pacific coast might write the researcher to point out that his experiment would be of real importance to his own study if he would include one other controllable factor. Several practicing dentists from all parts of the country might write in telling about their own observations of cases that appeared to be caused by the presence of the mineral in question. They might also point out some peculiarities of tooth discoloration that the research worker might look for and thereby prove or disprove some of their own suspicions that were based on only a few cases. A statistician might write to inform the researcher of a new method of analysis, not generally known, by which he could make his findings much more reliable. It is easy to understand that such a research project as originally planned would, by virtue of this preabstracting article, grow in scope and usefulness. It would inspire collaboration that would otherwise probably never have been possible. Moreover, the busy practicing dentist, with no time for research

of his own, would have a chance to contribute invaluable service to a project of tremendous importance to his profession.

It has been the purpose here to point out the value of a preabstracting service to dental research. No one must think that a preabstract would be as simple to prepare as the usual abstract. Whereas abstract material can be found by surveying the literature and can be written after perusal of the published article, the preabstractor has a much more difficult task. He must have contact with people at all institutions and in all areas, to keep himself informed as to what research plans are being made. He must also have created a journal section meriting such interest that research workers will volunteer information about their plans and their progress. The preabstractor must be a patient person, willing to write personal letters in an effort to gather all of the information needed for a single abstract. We will probably all agree that a worth while function would be served by preabstracting dental research and dental studies, but we must realize that the creation of such a department in journal or library cannot be realized overnight. It will demand careful planning and must in itself be considered a long-term program. Those who are interested in dental research should be giving thought to this problem and to ways in which a preabstracting service for dental research could be conducted.

University of Chicago.

POSTWAR PLANS OF DENTISTS IN SERVICE: II. PLANS FOR ADDITIONAL TRAINING*

C. Willard Camalier,† D.D.S., and Isidore Altman,‡ M.S., Washington, D. C.

The present report, the second in the series on the American Dental Association Postwar Planning Questionnaire, considers the subject of additional training after the war. It was shown in the first paper, which dealt with the general findings of the survey, that a high percentage, 73, of all dental officers are planning to seek additional training. In view of this fact, it is important to examine the data in some detail, to learn something more of the men who will seek training, the courses they are interested in, how much time they are willing to invest in training and the like.

*I. General Findings. J.A.D.A., 32:568, May 1, 1945.

†Chairman, War Service and Postwar Planning Committee, American Dental Association.

‡Associate statistician, Division of Public Health Methods, U. S. Public Health Service.

Source of the Data

The questionnaire was distributed among the 22,000 dentists on active duty by the War Service and Postwar Planning Committee of the Association, with the cooperation of the chiefs of the respective dental services. The majority of the dental officers received their questionnaires in September and October of 1944, and by January 1, 1945, 7,549 of the men, more than a third, had returned them. It is upon these 7,549 completed questionnaires that the present studies are based.

Covered in the questionnaire was, first, such general information as age, school and year of graduation, branch of service and activity prior to active duty. The section on postwar plans covered further education and training,

Table 1.—Percentage Distribution of Dental Officers in Each Service According to Plan for Additional Training After Discharge from Service

Training Desired	All Dental Officers	Dental Officers in			
		Army	Navy	Public Health Service	Veterans Administration
Planning additional training:					
Refresher course	26.4	26.4	28.0	13.7	11.4
Postgraduate course	36.9	37.4	35.7	46.2	24.0
Refresher and postgraduate courses	9.6	9.9	9.2	7.1	5.1
Medical school	0.4	0.4	0.4	—	—
Total planning for training	73.3	74.1	73.3	67.0	40.5
Undecided	7.1	6.7	7.1	12.1	19.0
No additional training planned	18.2	18.3	17.2	18.1	39.2
No answer	1.4	0.9	2.4	2.8	1.3
Total	100.0	100.0	100.0	100.0	100.0
Number of dental officers	7,549*	5,096	2,191	182	79

*Includes one officer whose branch of service was unknown.

interest in teaching, positions in industry or in state or local health departments, the possible desire to remain in service and several aspects of private practice. There was a final request for a list of important ways in which the American Dental Association can aid the returning dental officers.

As just stated, more than a third of the dental officers replied to the questionnaire. This third was shown in the first paper to be, as a sample, satisfactorily representative of the group as a whole; that is, the distribution of the ones who replied—by age, branch of service and place of origin—corresponded closely with the distribution of all dental officers in these respects. One can therefore be fairly confident that the findings from the sample hold for the entire group. Estimates can be made of the total number of dental officers who will engage in the various kinds of activities covered by the survey.

Plans for Training

The specific questions on training were presented to the dental officers in the following form:

17. Do you plan to receive additional training after discharge from service? Yes____ No____

18. If yes, training desired:
    Refresher course____
    Specify length of course (months)____
    Postgraduate course____
    Specify length of course (months)____

19. Fields of training desired:
    Orthodontia____
    Periodontia____
    Oral surgery____
    Operative____
    Prosthetic____
    Crown-bridge____
    Children____
    X-ray____
    Anesthesia____
    Plastic surgery____
    Public health____
    Other (specify) _____

20. Where would you prefer to study?

Name of institution

City State

The first column of Table 1 summarizes the replies of the dental officers to question 17 and that part of question 18 asking the officers to indicate whether they desired a refresher or a postgraduate course. (This column is the same as column 1 in Table 11 of the paper "General Findings.") In this column is the figure 73 (73.3), mentioned in the opening statement as the percentage planning to receive additional training after separation from service. The 73 per cent are divided into 26 per cent who checked "refresher course," 37 per cent who checked "postgraduate course," 10 per cent who checked both and 0.4 per cent who intend entering medical school.

The other columns of Table 1 show the distribution of replies according to branch of service. The parallelism in the replies by Army and Navy dental officers, who together comprise 96.5 per cent of the total who returned questionnaires, is striking; for example, there is less than one point difference in the total planning for training (74.1 and 73.3 per cent, respectively). Among Public Health Service dental officers, the percentage is 67 and among Veterans Administration officers, 41, but, in the latter service, a greater percentage of men will remain in service after the war.

Differences by age are shown in Table 2. As is to be expected, the percentage of officers who desire postwar training decreases with increasing age, from 79 per cent in the group under 30 years to 64 per cent in the group 40 years and over. It is to be noted that the decreases with age lie in the percentages checking postgraduate courses. The relative number who checked refresher courses is about the same in each age group.

The question may be raised as to how many will actually carry into execution their current plans for training. In this connection, it is well to observe in Table 2, first, that the younger men show a higher percentage interested in

Table 2.—Percentage Distribution in Specified Age Groups According to Plan for Additional Training After Discharge from Service

Training Desired	Dental Officers Aged			
	Under 30 Years	30-34 Years	35-39 Years	40 Years and Over
Planning additional training:				
Refresher course	25.4	27.6	26.1	26.9
Postgraduate course	42.2	36.8	35.1	29.3
Refresher and postgraduate courses	10.4	9.5	9.8	7.6
Medical school	0.7	0.3	0.1	0.2
Total planning for training	78.7	74.2	71.1	64.0
Undecided	5.1	7.7	8.3	8.5
No additional training planned	14.9	17.0	19.3	25.1
No answer	1.3	1.1	1.3	2.4
Total	100.0	100.0	100.0	100.0
Number of dental officers*	2,394	2,084	1,904	1,145

*Age of twenty-two dental officers was unknown.

training and, second, that the younger men (under 35 years) make up 60 per cent of the total replying. It seems reasonable to hold, though no definite proof can be offered for the assertion, that younger men are more apt to consummate their plans for training. It would follow from the foregoing that the final number enrolling in postwar courses will in all likelihood be high.

Regional differences, or similarities, the decision to pursue further training. A comparison between states containing a dental school and states that have none fails to reveal any meaningful differences. The percentage of men desiring training from states with dental schools was 73 and from the other states, 72 (not shown in the table). It is obvious then that those responsible for preparing training programs will have a sizable problem in every part of the country.

Table 3.—Percentage Distribution of Dental Officers According to Plan for Postwar Training and Region of Practice

Training Desired	Region of Practice			
	Northeastern States	North Central States	Southern States	Western States
Planning additional training:				
Refresher course	25.9	29.6	25.2	32.5
Postgraduate course	38.2	33.5	35.0	32.0
Refresher and postgraduate courses	12.8	7.6	5.4	9.2
Medical school	0.3	0.2	0.5	0.4
Total planning for training	77.2	70.9	66.1	74.1
Undecided	6.1	8.3	8.6	7.7
No additional training planned	15.6	19.9	23.7	17.4
No answer	1.1	0.9	1.6	0.8
Total	100.0	100.0	100.0	100.0
Number of dental officers*	1,948	1,904	801	828

*Data based on men who were in private practice before entering service. There were 5,495 officers in this group, fourteen of whom failed to indicate state of practice.

are examined next. In Table 3, the dental officers who had been in private practice before entering service are compared by the region from which they came. The highest percentage seeking training is to be found in the group from the Northeastern states (77 per cent), the lowest in the group from the Southern states (66 per cent). Even though the percentage in the South is lower than in the other regions, 66 per cent is still a high percentage of the men; in short, the percentage seeking training is high in each section of the country. Nor does the presence or absence of a school in the state seem to have any effect on

Field of Training

Table 4 shows the percentages checking each of the specified fields of training. (Column 1 of this table is the same as column 1, Table 13, of the paper "General Findings.") The percentages for the entire group who replied to the questionnaire range from 47.3 for oral surgery to 3.6 for public health and 2.7 for a miscellany of other subjects, chiefly office management and economics, dental medicine, oral diagnosis and pathology. The percentages shown may underestimate slightly the true proportions since 3 per cent of the men who said

"yes" to training failed to check any of the specified subjects.

In connection with choice of subject, there is one significant observation to be made, and that is that the order of subjects (in Table 4) follows the prewar distribution of dentists by field of specialty. Of about 70,000 dentists in private practice before the war, the percentages specializing, fully or in part, in the various fields for which data are available, were as shown in Table 5.

The high percentages planning on training indicate that, after the war, the number and percentage of full and part dental specialists may be increased. The war may accentuate a trend in this direction, which, even before the war, was marked.

When the field of training is related to the type of course, refresher or postgraduate, definite variations are found in the preferences of the officers. The subjects for which a majority preferred postgraduate courses were as follows, with the percentage checking postgraduate courses shown in parentheses after each: orthodontia (74 per cent), public health (67 per cent), anesthesia (62 per cent) and oral surgery (60 per cent). Refresher courses were preferred by most for operative dentistry (73 per cent—the percentage checking refresher course), crown-bridge (67 per cent), children's dentistry (62 per cent), prosthetic dentistry (59 per cent), periodontia (56 per cent) and x-ray (51 per cent). For every subject, the men who came directly from dental school or internship exceeded the men from private practice in relative number requesting a postgraduate course.

Table 4.—Percentage of Dental Officers in Different Age Groups Desiring Specified Fields of Training

Field of Training	All Ages	Age			
		Under 30 Years	30-34 Years	35-39 Years	40 Years and Over
Oral surgery	47.3	53.8	48.1	44.0	37.8
Prosthetics	39.0	40.9	37.4	39.2	37.6
Crown-bridge	25.7	31.2	25.6	23.3	18.7
Anesthesia	21.7	26.3	22.7	19.3	14.6
Orthodontia	17.3	20.6	19.3	15.7	10.0
Periodontia	9.7	10.7	9.7	9.7	7.7
Plastic surgery	8.3	10.3	7.5	7.4	6.5
Operative dentistry	7.3	5.8	7.1	8.6	8.8
Roentgenology	6.8	6.4	5.7	7.9	7.9
Children's dentistry	5.7	6.5	6.5	5.2	3.0
Public health	3.6	2.6	2.6	4.4	6.3
Other	2.7	2.6	2.1	3.0	3.1
Number of dental officers*	7,549	2,394	2,084	1,904	1,145

*Age of twenty-two dental officers was unknown.

Examination of the data by age, shown in Table 4, reveals interesting differences. The proportion of officers marking oral surgery, for example, decreases as age increases, from 54 per cent in the group under 30 years to 38 per cent in the group 40 years and older. The interest or felt need for training in crown-bridge, anesthesia, orthodontia, periodontia, plastic surgery and children's dentistry tends also to decrease with age. On the other hand, the older men show a greater interest than the younger men do in operative dentistry, roentgenology and public health.

The field of public health was checked by more than 6 per cent of the men 40 years and over as against less than 3 per cent of men under 30 years. This is not entirely because a greater number of older men had come from positions in public health; for, of the men 40 years and over who had been in private practice before entering service, 6.4 per cent checked public health, and, of the men under 30 years in this group, 2.9 per cent checked this subject.

When a comparison is made of the number checking public health as a field for training with the number who would take positions in a state or a local health department or school clinic, it is found that almost 30 per cent of the men said they would accept such positions while less than 4 per cent checked training in public health. The reason for the difference presumably is that dentists in such employment are still largely engaged in diagnostic and operative work, and comparatively few occupy themselves with the administrative and policy aspects of public health dentistry. Furthermore, 90 per cent of those indicating preference for such positions evidently had part-time jobs in mind, since they also indicated an intention to enter private practice.

Table 5.—Specialties Represented Among 70,000 Dentists in Private Practice Before War

Specialties	Percentage
Oral surgery	21.3
Prosthodontia	8.7
Orthodontia	3.7
Periodontia	2.3
Children's dentistry	1.8
Roentgenology	0.9

*Based on 1940 Census and dental questionnaire of the Procurement and Assignment Service.

Combinations of Fields of Training

It is obvious, from the percentages shown in Table 4, that most of the dental officers checked several fields of training. Indeed, the percentage of men interested in training who checked more than one subject was 76. Since any number of subjects up to twelve could be marked (counting "other" as one subject), it was possible to have 4,095 different combinations of such checks. Even a partial listing of the combinations that occurred would occupy too much space. Instead, the great variety of choice is indicated in small degree by the fifteen most frequent combinations with oral surgery. These are listed in Table 6.

Table 6.—Subjects Most Frequently Indicated in Combination with Oral Surgery

Subject	Times Checked
Prosthetics	373
Anesthesia	296
Prosthetics and crown-bridge	294
Orthodontia	129
Anesthesia and plastic surgery	126
Plastic surgery	121
Prosthetics and anesthesia	107
Prosthetics, crown-bridge and anesthesia	98
Crown-bridge	68
Operative dentistry, prosthetics and crown-bridge	56
Roentgenology and anesthesia	51
Roentgenology, anesthesia and plastic surgery	44
Orthodontia and prosthetics	41
Periodontia	40
Orthodontia and anesthesia	36

Length of Training Courses

An important question in connection with postwar training is the amount of time that the returning dental officers plan or would prefer to spend on such training. The replies on this point are summarized in Table 7, where a division is made between refresher and postgraduate courses. The periods of time indicated by the men have an extensive range, from a month to several years; but concentration at certain periods is

well marked. Thus, of the officers preferring refresher courses, 47 per cent indicated three months' time or less; of those checking postgraduate courses, 56 per cent indicated seven to twelve months' time. In general, most replies were clustered at the upper level of the time interval indicated in the table; for example, of the group specifying some period of time between seven and twelve months, 78 per cent preferred twelve months.

Examination of the data when the officers are divided according to status prior to active service (a breakdown of the data according to activity of the men prior to active service that follows the procedure observed in the paper on "General Findings") brings out a point that may be of some importance: The officers who came directly from dental school or internship (Group B) show a distinct tendency to request longer courses than do the men who came from private practice (Group A). This is true of both refresher and postgraduate courses, as Table 8 shows. One reason may be that the men in Group A are taking into account the experience that they have had in the particular fields of study; another, that many of the men just out of dental school have as goals graduate degrees in dentistry or allied fields, and those degrees require an extended period of study. In any event, the differences may have an effect on the kind of courses actually pursued after the war.

The element of time has its greatest usefulness, from the viewpoint of program planning, when related to the specific subjects; but, as indicated, so many different combinations of subjects were checked that programs cannot be planned with too great precision. There were three subjects, orthodontia, oral surgery and prosthetic dentistry, which were marked often enough by themselves to permit of linking them to the question of time. The data are shown in Table 9. As refresher courses, these three subjects are not expected by most of the men selecting them alone to consume more than six months' time. Some of the others must have intended to indicate postgraduate courses.

Table 7.—Percentage Distribution of Dental Officers Desiring Refresher or Postgraduate Courses According to Desired Length of Course

Length of Course Months	Refresher Course				Postgraduate Course			
	All Dental Officers	Status Prior to Active Service			All Dental Officers	Status Prior to Active Service		
		A Private Practice	B Dental School or Internship	C Salaried Position		A Private Practice	B Dental School or Internship	C Salaried Position
3 or less	47.1	50.4	35.5	45.7	11.9	13.7	7.1	13.6
4— 6	35.0	32.5	44.1	32.6	24.8	26.9	20.0	19.8
7—12	17.7	16.9	20.1	21.7	56.3	54.1	61.8	58.3
13—24	0.2	0.2	0.3	—	6.2	4.6	10.1	6.2
More than 24	—	—	—	—	0.8	0.7	1.0	2.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of officers giving information	1,530	1,160	324	46	2,282	1,580	606	96

The men who are taking orthodontia as a postgraduate course plan, most of them, to spend a year or two in study. Only a tenth indicated less than a year's time. On the other hand, it is apparently felt by men in service that oral surgery and prosthetic dentistry do not require so long a period of preparation as orthodontia. Thirty-nine per cent of the oral surgery group and 52 per cent of the prosthesis group specified six months' time or less.

Table 8.—Percentage of Men Desiring Refresher Courses of Four Plus or Postgraduate Courses of Seven Plus Months

	Group A Per Cent	Group B Per Cent
Those checking refresher course who desire course of four months or more	49.6	64.5
Those checking postgraduate course who desire course of seven months or more	59.4	72.9

Table 9.—Percentage Distribution of Dental Officers Checking Only Orthodontia, Oral Surgery or Dental Prosthesis According to Desired Length of Course

Length of Course Months	Refresher Course			Postgraduate Course		
	Ortho-dontia	Oral Surgery	Prosthetics	Ortho-dontia	Oral Surgery	Prosthetics
3 or less	38.6	48.2	58.6	4.3	13.8	20.7
4— 6	35.7	40.7	28.6	6.8	25.2	31.5
7—12	21.4	9.2	12.8	71.3	57.2	47.8
13—24	4.3	1.9	—	16.4	3.1	—
More than 24	—	—	—	1.2	0.7	—
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of dental officers	70	54	70	324	290	92

Most of the officers who indicated more than one field apparently intend to carry these subjects simultaneously, because, on the average, the length of the course indicated was unchanged, whether one subject or more than one subject was checked.

Schools Preferred for Training

The last item on the questionnaire dealing with the subject of postwar training was No. 20: "Where would you prefer to study?" In planning programs for specific institutions, the number of men who might be expected to attend and the subjects they will choose are of obvious importance; but the details of a school-by-school presentation are too involved for the purposes of this paper, and only generalized data are presented.

Of 6,026 dental officers who expressed an interest in training, 4,350, or 72 per cent, answered question 20, but not all of these named one of the recognized schools of dentistry in this country. Four per cent of the 4,350 gave only the city in which they preferred to study, and almost invariably this city was home or some large community near home. Five per cent named institutions that were not schools of dentistry. Among these were medical schools, hospitals and dental clinics. Ten per cent named more than one dental school.

Choice of school was not random. There were nine schools selected by more men than these schools had graduates in service and who planned postwar training. Two of the nine were designated by several times their number of graduates interested in training. These are established graduate institutions, and their courses of study are known to the

dental profession. If the men had thought that the courses they wanted were to be offered at institutions within reach, it is probable that a greater number would have selected such schools. As a matter of fact, 51 per cent of the men naming a dental school in the United States selected the school from which they graduated. While the percentage varied from school to school, the 51 per cent is an average figure, which will give the schools some idea of the number who hope to come back for further training.

Summary and Conclusion

More than 73 per cent of dental officers now in service plan to receive additional training after the war. If to this figure is added the percentage who indicated that they were undecided about training, the total is more than 80. The number of officers preferring their training in the form of postgraduate courses is 40 per cent greater than the number checking refresher courses.

Few dental officers in the Public Health Service and Veterans Administration plan to seek postwar training as compared with Army and Navy officers, but the total number of dental officers in the former two services is small. Interest in training declines as age increases, although the percentage in the older groups is still high. Substantial differences by geographic division of the country are not discernible, except possibly between the Northeastern states (77 per cent desiring training) and the Southern states (66 per cent).

The percentages checking each field of training tend to follow in their order the trends in specialization in dental practice. The five subjects checked most frequently and the percentage of men returning questionnaires who checked them, were: oral surgery, 47.3; prosthetics, 39.0; crown-bridge, 25.7; anesthesia, 21.7, and orthodontia, 17.3.

The length of time to be devoted to study varied from a few weeks to several years, but the choices were concentrated at certain periods. Eighty-two per cent of those stating a time for refresher courses specified six months or less, and 63 per cent of the group to take a postgraduate course specified more than six months of study. New graduates indicated, on the average, a longer course of study than did the men who came from private practice.

The school of study, where a preference was indicated, was, in 51 per cent of the cases, the school where the degree in dentistry had been received. The remainder of the men tended to choose schools well known for the graduate work offered.

What do the data that have been presented signify? The first conclusion to be drawn from the fact that the large bulk of the dentists now in service are planning on postwar training is that extensive program planning for such training will have to be done. The aid of dental schools, state and local societies and hospitals must be enlisted in the program. A great deal of attention will have to be given to the supply of teachers and to their training.

While it may be true that many dentists will later change their minds about schooling, because of economic stringency or for other reasons, the group answering question 17 in the affirmative is so large that the number eventually carrying their intentions into effect will remain high. The "G. I. Bill of Rights," with its provisions for education, may induce many who might not have done so otherwise to take training courses.

Obviously, it will be impossible to accede to all the wishes of all the men, particularly as to school and length of course. The latter may have to be determined by leaders in the field of dental education and in the dental societies. Nevertheless, the wishes of the men must be kept in mind in any program design. Those charged with the planning and

execution of the program should be guided as far as possible by the desires expressed by the majority or by large numbers of officers.

The data as presented here are not sufficient for final planning purposes. The object in presenting them has been to acquaint the profession with their content and possibilities, and with the general aspects of the problems of postwar training. As should be clear, the problems of a large training program are of such magnitude that the time to begin meeting them is now. It will not do to hold in abeyance the formulation of programs until it is learned how many actually apply for the courses indicated; nor is a waiting attitude helpful. An active effort should be made to see that the men carry their plans for training into effect. If more than 70 per cent of the dentists leaving service invest in postgraduate or refresher courses, the resulting benefit, for the profession and for the American people, will be immeasurable.

SURGICAL GINGIVECTOMY*

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Surgical gingivectomy is frequently the method chosen for the elimination of gingival pockets. There are other methods available, such as electrocoagulation, chemical coagulation or, the most conservative method, subgingival curettage. All can be used to advantage and each has its place. Any one who limits himself to the use of one of these methods is greatly handicapped because he thus can handle only certain cases successfully. Utilizing the different methods according to the nature of the case gives one a larger field of service. Even in surgery, there are different ways to success, and here a plan of treatment is presented which is easily carried out and will bring about rapid and complete elimination of the pockets. In this method, special stress is laid upon the postoperative treatment of the wound surface and the inflamed tissues. It is not enough to eliminate the excess gingival tissues: the overgranulation of the wound surface has to be checked and the chronic inflammatory tissue below the bottom of the gingival pocket must be stimulated so as to change into an active mesenchymal tissue capable of regenerative activity.

The case to be treated is shown in Figure 1, *a*. The depth of the pockets is measured with an explorer (Fig. 1, *b*), which is carried into the pocket when the sharp point is kept on the tooth surface. By means of the sharp point of the explorer, all irregularities (calculus deposits) will be evident to the operator, who will thus have information as to the condition of the root surface. The short, sharp point of the explorer is bent in a right angle, this permitting penetration of the explorer into the pocket without injury or pain (Fig. 1, *c*). Figure 2, *a* shows the relationship between bone and teeth, but does not give any information with regard to the depth of the pockets. If one wishes to observe or indicate the depth of a pocket in a roentgenogram, a guttapercha or metal point should be inserted in the pocket. The peripheral end of this foreign body should be clipped off or bent over at the gingival

*From the Department of Research, Loyola University School of Dentistry, Chicago College of Dental Surgery.

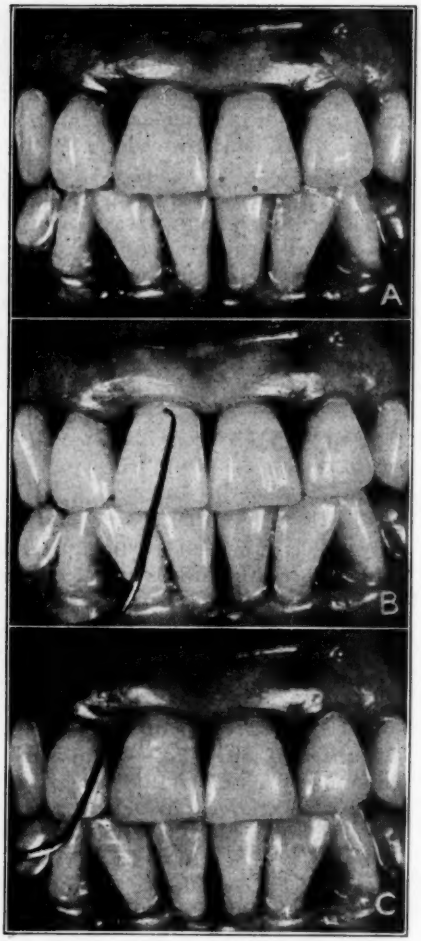

Fig. 1.—*A:* Case before treatment. *B* and *C:* Depths of pockets measured with explorer.

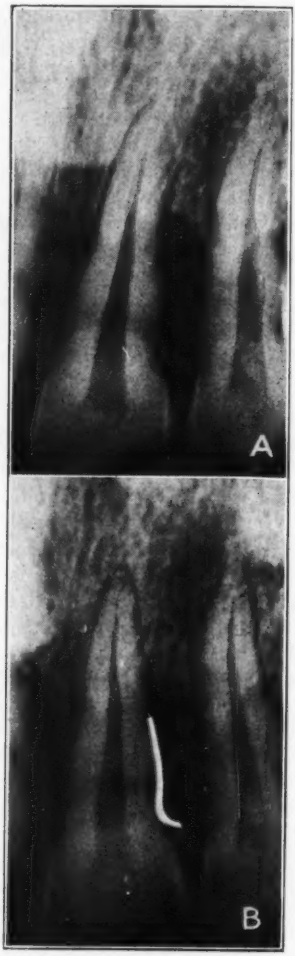

Fig. 2.—Bone destruction (*A*) and depths of pocket measured with silver point (*B*).

margin (Fig. 2, *b*). Between the bottom of the gingival pocket and the margin of the alveolar crest, there might be a tissue area of different width, mostly between 1 and 3 mm.

After the depth of the gingival pockets has been determined, and the surgical method of elimination decided on, a local anesthetic is applied. The mucous membrane is touched (Fig. 3) with a solution of phenol crystals, 10 gm., heated to 60° C., with camphor (true), 33 gm., slowly added until completely dissolved. The mixture is then cooled, filtered and kept in a dark bottle. The injection is given in the loose submucous tissue of the buccomucous fold (Fig. 4).

The instruments used for performing the gingivectomy are a pair of knives (Fig. 5) and a pair of scissors (Fig. 6).

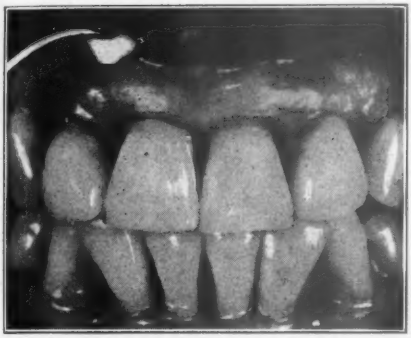

Fig. 3.—Mucous membrane sterilized with camphorated phenol before injection.

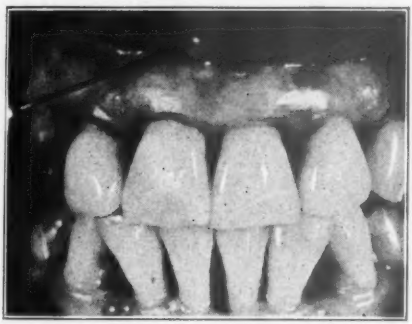

Fig. 4.—Anesthesia given into loose buccomucous fold.

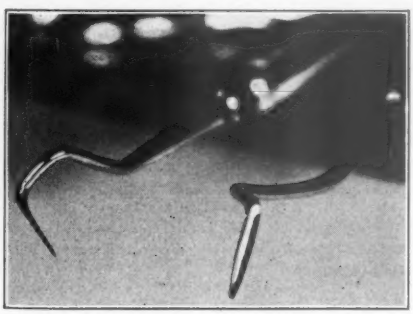

Fig. 5.—Pair of knives for gingivectomy.

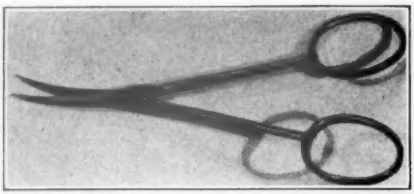

Fig. 6.—Pair of scissors for gingivectomy.

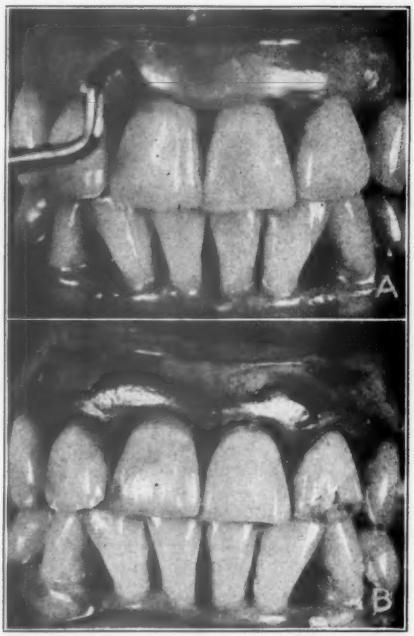

Fig. 7.—Incision made at bottom of the gingival pocket (*A*) and carried along bottom of all pockets (*B*).

The incision is made at the base of the pocket (Fig. 7, *a*) and the cut is made from here along the entire area, following the bottom of the gingival pocket all around the teeth (Fig. 7, *b*). This operation can be limited to one pocket on a tooth or to an entire group of teeth having pockets. It is not advisable to perform the operation in the whole mouth at one time, but in quarters, or even in six sections.

The entire dissected gingiva is removed (Fig. 8, *a*) and the bleeding is stopped by packing with gauze (Fig. 8, *b*). The gauze can be dipped in an

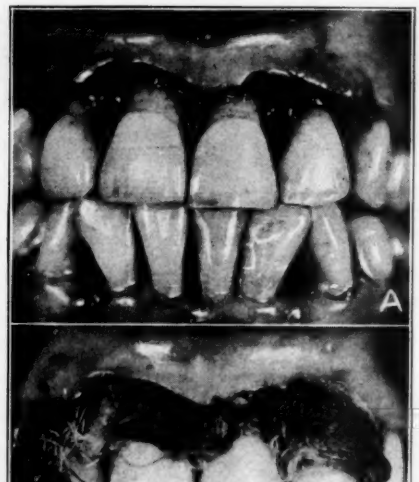

Fig. 8.—*A:* Dissected gingiva removed. *B:* Bleeding stopped with gauze. *C:* Wound covered with zinc oxide pack.

epinephrine solution (1:1,000) or used, when moistened with water, under slight

1. Powder	Gm.
Zinc oxide	70
Zinc acetate	1
Zinc stearate	1
Rosin	28
Liquid	Cc.
Eugenol	85
Cotton seed oil	15

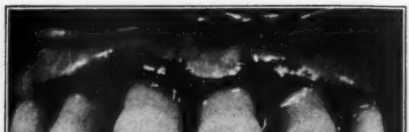

Fig. 9.—Granulating wound surface.

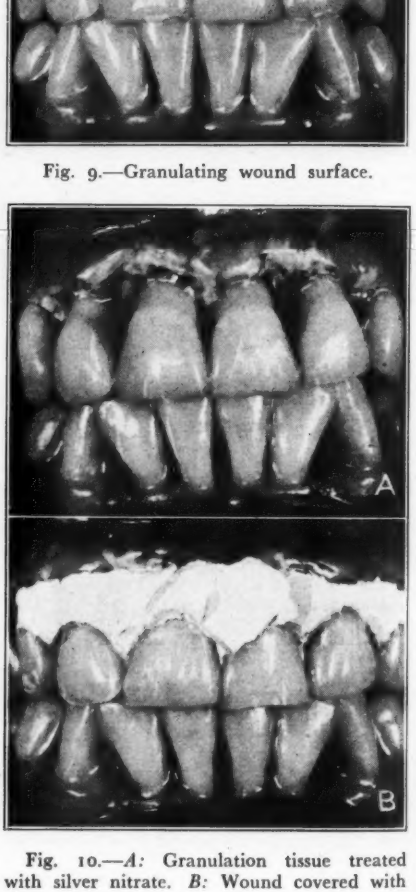

Fig. 10.—*A:* Granulation tissue treated with silver nitrate. *B:* Wound covered with zinc oxide pack.

pressure. After the bleeding has been controlled, a zinc oxide-eugenol cement pack[1] is placed (Fig. 8, *c*) upon the wound surface. This pack should be removed in two or three days and the wound surface treated. After removal of the pack, the wound surface will show

a blood clot and more or less active granulation tissue. (Fig. 9.) This granulating wound surface must be treated with an astringent drug, such as silver nitrate, zinc chloride or trichloracetic acid. Silver nitrate should be used in crystal form. A loop-shaped instrument (Fig. 11) is heated over a flame, then dipped into a bottle containing the silver nitrate crystals, which will adhere to the hot instrument, and when heated over the flame, will melt into the loop of the instrument. After cooling, the silver nitrate loop is dipped in water and the surface of the wound touched. The silver nitrate will immediately form a white precipitate, coagulating the surface granulation tissue (Fig. 10, *a*). A zinc oxide-eugenol pack is again placed as shown in Figure 11, *b*.

Instead of silver nitrate, zinc chloride (10 per cent) or trichloracetic acid (30 per cent) can be used. Zinc chloride is often too weak for elimination of the cessive granulation. Trichloracetic acid is stronger and penetrates somewhat deeper. Wherever silver nitrate can be used, and when the discoloration of the teeth is not feared, it is preferable, but the two other solutions are often just as satisfactory.

When there is danger of discoloration by silver nitrate, the tooth surface should immediately be cleaned with pumice on rubber cups, and also strips, after each application of the silver nitrate.

Silver nitrate does not penetrate very deeply and its action is sharply limited. The coagulated white surface layer is cast off within two or three days and the treatment is repeated as shown in Figure 12. This treatment is repeated every two or three days for as long as the granulation tends to grow over the wound surface.

In about twelve days after the operation (Fig. 13, *a*), the wound surface will appear paler and will begin to be covered by epithelium, which grows from the edges of the wound.

In this stage of healing, a new step is introduced into the postoperative treatment. A zinc oxide-eugenol pack is no longer necessary. The sensitiveness of the wound surface is greatly reduced and home care by the patient can be started. However, it is most important that the chronic granulation tissue, which is always found in gingival inflammation, be treated. The granulation tissue consists mainly of an accumulation of plasma cells. Frequently, these cells are crowded so densely into the tissues that they overshadow all other tissue elements. There are only a few blood vessels present and the circulation is very poor. We can assume that the local oxidation process is also reduced and a local acidosis exists. To eliminate this granulation tissue, some operators use the surgical method; that is, remove the entire granulation area by scraping the tissue with an excavator or surgical spoon, from the wound surface to the entrance of the periodontal membrane; i.e., the bone surface. Others even remove some of the bone to be sure that they have eliminated all granulation tissue. In doing this, however, all tissue elements from which a regeneration of the alveolar crest could be expected have been removed. By proper medication of the gingiva with concentrated hydrogen peroxide, 30 per cent, neutralized with 5 per cent sodium bicarbonate (1 drop of the sodium bicarbonate solution to

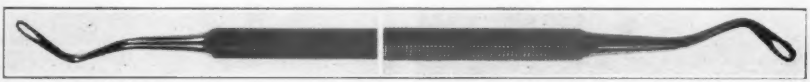

Fig. 11.—Loop-shaped instrument for application of silver nitrate.

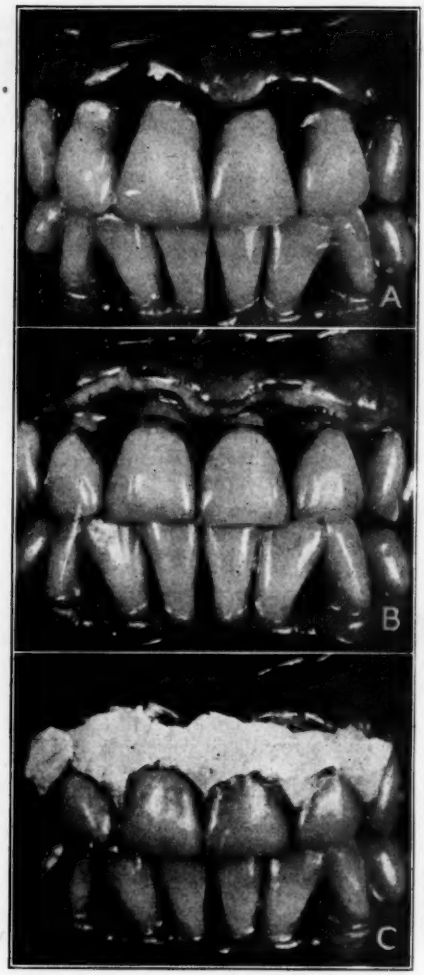

Fig. 12.—Treatment with silver nitrate repeated. *A:* Granulating wound surface. *B:* Granulation treated with silver nitrate. *C:* Zinc oxide pack.

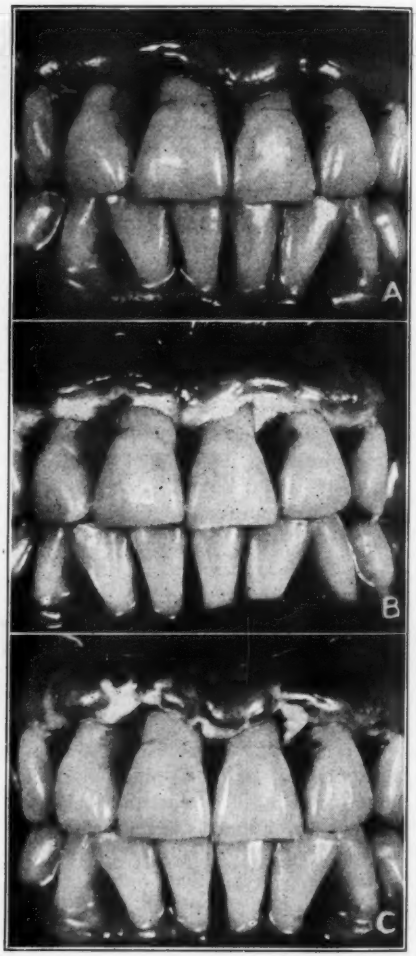

Fig. 13.—*A:* Wound surface twelve days after operation. *B:* Tissue treated with concentrated hydrogen peroxide. *C:* Tissue treated with silver nitrate.

10 drops of the hydrogen peroxide solution) this granulation tissue can be transformed into a very active mesenchymal tissue with all the properties necessary for regeneration.[2] The peroxide is carried to the interdental spaces and gingival margin by means of cotton pellets and thus is applied to the healing wound surface. The cotton pellets should be pressed slightly against the gingiva and, after one or two applications, the gingiva turns white (Fig. 13, *b*). This blanching is due to penetra-

2. Orban, Balint: Action of Oxygen on Chronically Inflamed Gingival Tissue. J.A.D.A., 29:2018, November 1, 1942.

tion of oxygen bubbles into the tissues. In about five to fifteen minutes after application, the whiteness of the gingiva disappears, owing to disappearance of the oxygen bubbles from the tissues. After this has taken place, silver nitrate (Fig. 13, *c*) is applied (or zinc chloride or trichloracetic acid).

The application of the astringent drug is repeated as often as seems necessary because of excessive granulation. At times, this is more extensive, differing with the particular case. Usually, from four to six applications are sufficient, used two to three days apart. Sometimes, even from three to four weeks after gingivectomy, excessive granulation may be evident in certain regions, and this condition should be taken care of by the use of an astringent.

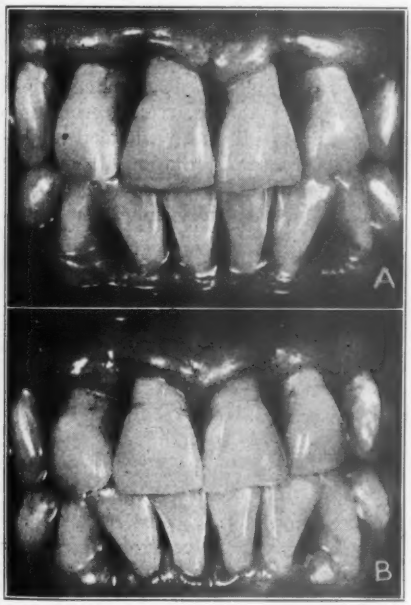

Fig. 14.—*A:* Case five weeks after gingivectomy. *B:* Case one year after operation.

Concentrated hydrogen peroxide should be applied at least eight to ten times within from three to five weeks. This means a treatment two or three times every week. It is advisable to continue this treatment for at least two weeks beyond the time of actual epithelization of the wound surface, which takes place about fourteen days after gingivectomy. The entire treatment would thus take from four to five weeks.

Figure 14, *a* shows the case five weeks after gingivectomy; *b*, one year after operation.

Of course, proper home care, massage, brushing, interdental stimulation and periodic cleaning by the dentist are necessary to maintain the health of the tissues.

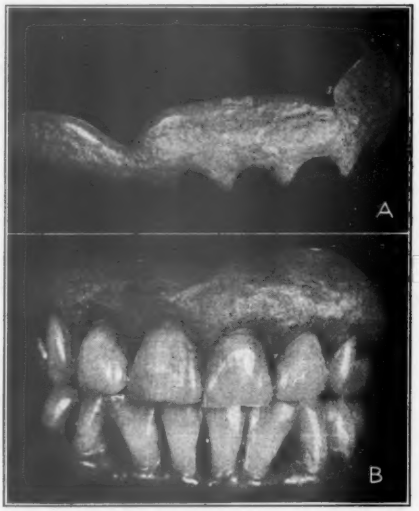

Fig. 15.—Plastic gum prosthesis (*A*) to improve appearance (*B*).

As seen in Figure 14, the appearance of the teeth is not very good, especially since the patient has a short upper lip and, even in smiling slightly, shows the entire upper gingiva. To compensate for this shortcoming, a plastic gum prosthesis was constructed after a hydrocolloid impression (Fig. 15, *a*) had been

taken and this prosthesis covers the root surfaces and large interdental spaces (Fig. 15, *b*) thus affording a normal appearance.

This appliance has been worn by the patient for more than a year. It is kept very clean and is used only during the day.

SUMMARY

1. Surgical gingivectomy is one method of many to eliminate deep gingival pockets.

2. Gingivectomy alone will not cure gingival inflammation. Postoperative treatment is necessary to bring about healing in chronic inflammation.

3. In postoperative treatment, there are two problems to deal with: (1) elimination of excessive overgranulation above the wound surface and (2) stimulation of tissue so as to change chronic inflammatory granulation tissue into active mesenchymal tissue.

4. To eliminate excessive granulation tissue, an astringent drug can be used to coagulate this young overgrown tissue. Silver nitrate, zinc chloride, trichloracetic acid, phenol, etc., can be used. Application has to be repeated as often as granulation tissue appears on the wound surface.

5. To bring about a change of the chronic granulation tissue into an active mesenchymal tissue, concentrated hydrogen peroxide must be used. The application is repeated two to three times a week for from four to eight weeks.

6. Proper home care, brushing, massage and stimulation of the gingiva are necessary to maintain results. From time to time, the teeth must be scaled to prevent recurrence of irritation (from three to six months according to need).

7. An unsatisfactory appearance after gingivectomy can be corrected by means of a plastic (acrylic) gingival prosthesis.

PARTSCH OPERATION FOR MANDIBULAR CYST

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The purpose of this paper is to encourage the use of a principle established by Partsch, of Germany, before the turn of the century. It is not a sufficiently well-known or much-used approach, but many patients, especially in the case of the larger cyst, would be benefited by allowing Partsch and Nature to have the major role, rather than extensive surgical procedures and enucleation. It is a technic that requires much less surgical training and experience than does enucleation, and it may often be well-handled by the careful general practitioner of dentistry.

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All opinions or statements contained herein are those of the writer and are not to be construed as official or the views of the Navy Department or the naval service at large.

Jour. A.D.A., Vol. 32, June 1, 1945

REPORT OF CASE

History.—A girl, aged 21, in good health, presented herself for diagnosis and treatment of a lower third molar area which was causing slight discomfort.

Examination.—A moderate amount of hard swelling was evident at the angle of the left side of the mandible. A full complement of teeth were present and the mouth was clean, with all soft tissues of healthy appearance. There was no evidence of a lower third molar. The second molar was slightly moveable, as though it might be mounted in hard rubber. There was little

or no pain on palpation, but the overlying tissues in the third molar area were slightly bulged. This distention area was firm and extended the entire width of the mandible, from the first molar region distally as far as could be determined. A small amount of thin straw-colored odorless fluid was draining from the distal surface of the second molar. The discharge was increased when a

for the tooth, which would "erupt in due time."

A roentgen-ray examination revealed extensive bone loss. The mesioclusal cusp of the third molar was also shown, deeply seated in the body of the mandible. (Fig. 1.) The remainder of the cyst was observed in another x-ray film, which was large enough to show the complete loss of bone substance

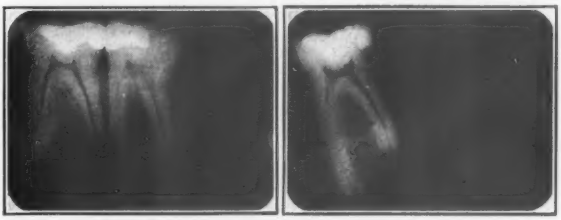

Fig. 1.—Extensive bone loss; mesial cusp of third molar seated deeply in body of mandible.

Fig. 2.—Complete loss of bone substance within body of mandible; film showing remainder of cyst.

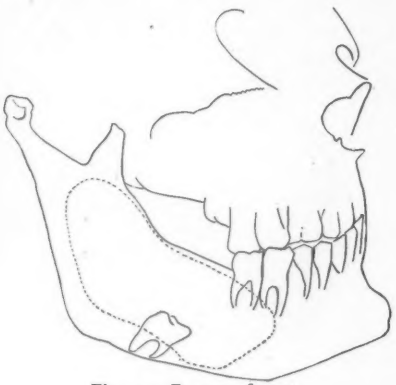

Fig. 3.—Extent of cyst.

blunt, thin flat instrument actually dropped into a pit. There was no cervical adenopathy.

The temperature was normal and the patient was conscious only of slight discomfort, and the slowly increasing prominence at the angle of the mandible. She complained of occasional severe headache accompanied with slight dizziness. The blood showed normal hemoglobin, 5,000,000 erythrocytes and 13,450 leukocytes. There had been a moderate periodic "wisdom-tooth trouble" in that area during the past four or five years. During that time, the patient had had several examinations and had repeatedly been assured that there was plenty of room

within the body of the mandible at the angle. (Fig. 2.)

Dentigerous cyst extending from the first molar to near the sigmoid notch of the ramus was diagnosed. (Fig. 3.) The fluid within the cyst apparently caused pressure resorption of the bone within the cortical boundaries of that part of the mandible. The first molar and the teeth mesially from it responded normally to ice applications, but the second molar appeared to be nonvital. Although showing slight resorption, the distal root of the first molar remained healthy and vital throughout the entire treatment.

An occlusal x-ray examination revealed distention of the buccal plate. (Fig. 4.) At this time, consultation suggested a dentigerous cyst, but, for the protection of the operator and to rule out a possible adamantinoma or other tumorous conditions, a biopsy was made, even though the diagnosis seemed obvious.

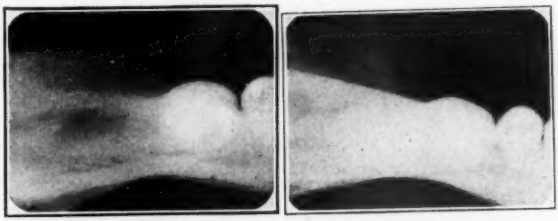

Fig. 4.—Occlusal x-ray film showing distention of buccal plate.

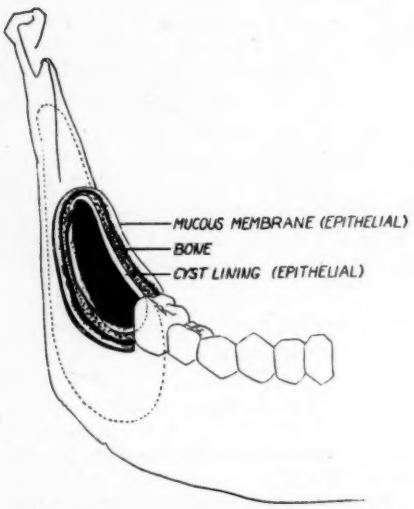

Fig. 5.—Incision made with scalpel, isolating island of tissue and incorporating second molar and area buccally and distally from it.

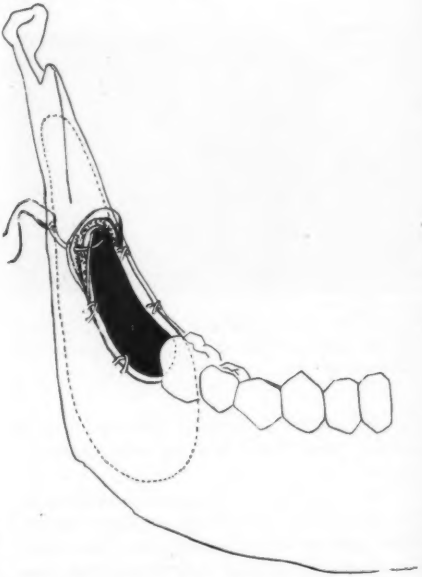

Fig. 6.—Raw edge of epithelial lining tacked to raw edge of cyst lining with horsehair sutures.

Biopsy.—Under procaine infiltration, a triangular piece of tissue about 3 mm. across was removed from the area just distally from the second molar. Only a scalpel was used to make the three-layered section. This section included the normal epithelial and periosteal tissues covering the mandible, the thin cortical bony cap covering the cyst cavity and the immediately underlying part of the cyst lining. This section was examined microscopically to eliminate any possibility of malignancy. The following laboratory report established the presence of only normal histologic tissues: Tissue examination: Origin: Bone cyst in lower jaw. Microscopic examination revealed small fragments of tissue. These were mounted in paraffin and sections were stained with hematoxylin-eosin. The material consisted of fibrous connective tissue, within which were some leukocytes. The squamous epithelial tissues that

were present were rather normal. There was no malignancy.

I wish to emphasize that "the epithelial tissues present were rather normal"; i.e., the epithelial covering of the mandible and the epithelial lining of the cyst were histologically related. This fact had a direct bearing on the treatment followed. Apparently, Nature's purpose regarding such epithelial tissue is to prevent the invasion of outside and foreign elements into the structure of the bone.

From the operator's reasoning, two approaches were possible: (1) removal of the second and third molar and complete enucleation of the cyst lining; (2) removal of the same teeth and application of the Partsch principles. The Partsch operation, with modifications, was decided on because of the following dangers from complete enucleation: 1. It would be difficult, or impossible, to completely enucleate the cyst lining in such an extensive cavity, which contained partial partitions and various ramifications. 2. The mandibular nerve and vessels that had been displaced to the floor of the cyst cavity could have very easily been involved, presenting the possible complications of hemorrhage and paresthesia. 3. Fluids of the mouth or any medicaments used might contaminate or injure the bone adjacent to the cyst. If this happened, additional loss of bone from necrosis might mean a pathologic fracture, resulting in loss of a large section of mandible.

Operators generally agree that the enucleation of smaller cysts is desirable because healing is usually rapid and uneventful. In such cases, the cavity is filled with a healthy blood clot, which first develops physiologically into normal fibrous connective tissue and then into bone. In cysts as large as this one, and in many somewhat smaller, it is doubtful whether a blood clot could be developed and maintained to become normal bone. It is also doubtful whether continuous packing with gauze and medicaments could have prevented further loss of bone. This point will be clear to those operators who have found it necessary to continuously pack large so-called dry sockets and other larger areas of dry exposed bone. In this case, we had so little bone remaining that we could not afford even a small sequestrum.

The Partsch principle refers us to the fact mentioned earlier in this paper that a cyst is lined with a protective cover of epithelial cells, devised by Nature to prevent the penetration of cystic fluid into healthy surrounding bone. The lining appears to be a definite protective

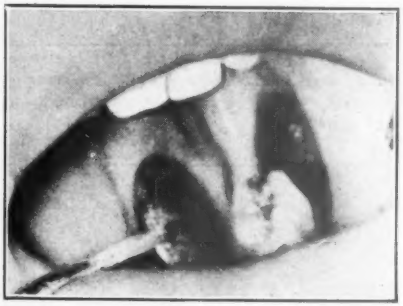

Fig. 7.—Appearance of operative area one week after operation.

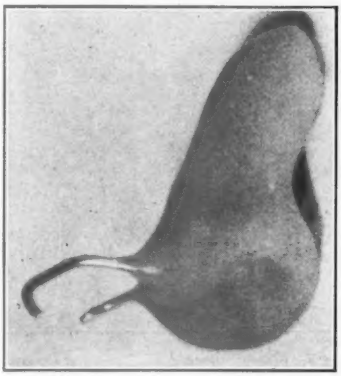

Fig. 8.—Obturator.

feature. As stated by Schaefer,[1] "a cyst is a sac lined with epithelium which is supported by a varying amount of connective tissue." In the Partsch operation, that lining of specialized, normal cells is allowed to remain—it is not destroyed, as in enucleation. Actually, the epithelial lining of the cyst becomes part of the epithelial lining of the oral cavity. This joining of the two epithelial linings continues to protect the bone from outside elements, as Nature apparently planned it should. In the treatment of a dry socket, we work to encourage Nature to cover the exposed bone with a thin layer of epithelial

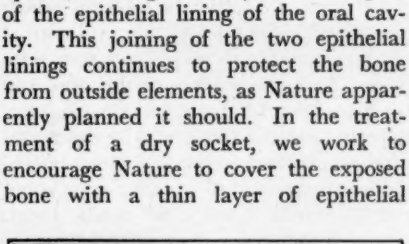

Fig. 9.—Obturator in place.

cells. Knowing that the exposed bone is not added to directly without the development of a thin membrane of epithelial cells, we encourage the production of this membrane. We realize that the new bone is built behind that membrane. Why, then, should we destroy, by enucleation or curetment, the protection that we desire, and later encourage Nature to create a new lining?

Operation — After premedication with phenobarbital of 1½ grains one-half hour before operating time, one-sixth grain of morphine sulfate was administered hypodermically. An alkaline solution of procaine borate was used in infradental nerve block anesthesia. A continuous incision was made, isolating an island of tissue, which was distally and slightly buccally from the first molar (Fig. 5), completely incorporating the

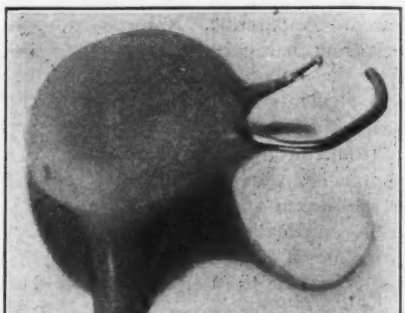

Fig. 10.—Top portion of obturator remaining after reductions to make adjustments to bone growth.

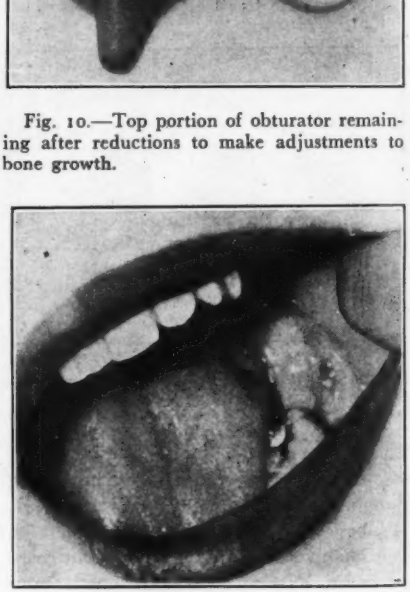

Fig. 11.—Appearance of area after eight months, showing opening to cyst entirely closed.

second molar and a considerable area buccally and distally from it. In making this outline with the scalpel, the instrument went through the thin overlying cortical bone and cyst lining in many places. In the other places, the rongeur forceps was used. The

1. Schaefer, J. E.: D. Digest, 43:382, August 1937.

second molar was then cut out with a cross-cut bur and removed by the operator's fingers. Trauma from forceps was avoided because of the danger of fracturing the remaining mandible.

The outlined island of tissue was removed with the scalpel and rongeurs and the cut edge of cortical bone was smoothed. This removed the cap from the cyst much as one would remove a lid from a tea-kettle. The resulting opening was about 15 mm. wide and 25 mm. long. Through this opening, the third molar was readily accessible. This tooth was solidly set with well-developed bifurcated roots into the lower border of the mandible, but it was carefully loosened with a long bibevel drill in a contra-angle and then rolled out with a light curetment. Extreme caution was used to prevent trauma to the little remaining bone or the cyst lining.

Next, the raw edge of the epithelial lining of the mouth was tacked to the raw edge of the cyst lining with six horsehair sutures. (Fig. 6.) The small amount of exposed cortical bone was covered by the union of the two approximating epithelial tissues. Actually, the oral cavity now extended into the mandible to the limits of the cyst.

Course.—The cavity was packed with sulfathiazole powder and vaselin gauze, and the patient was hospitalized for three days. After the operation, there was a minimum of pain, no change in temperature, and no paresthesia or other complications. The dressing was replaced every forty-eight hours for the first week, after which the picture in Figure 7 was taken.

At this time, an impression was also taken and an obturator constructed. (Fig. 8.) This obturator was built of acrylic with a clasp that stabilized it to the first molar, and was fitted loosely in the opening running down into the cyst cavity as a cork is in a bottle. Figure 9 shows the obturator in place. It was about 32 mm. long, and its purpose was twofold: to keep food from entering the cavity and to maintain an adequate opening at the top for good observation, irrigation and permanent drainage.

Each morning and evening, the patient irrigated the cavity with a quart of warm saline solution and placed a small pad of sulfathiazole paste in the cavity before replacing the obturator. After the first few days of such irrigation, the cyst lining lost its darker tone and assumed the appearance of the other epithelial tissues of the oral cavity. Use of the paste was then discontinued. The cyst cavity rapidly began to shrink in size as new bone filled in behind the lining.

As the tissues came in contact with the obturator, it was regularly cut down to keep ahead of the bone growth. Finally, the bone cavity filled with new bone at the base, gradually exfoliating the lining, until only the top portion of the obturator remained. (Fig. 10.) At this stage, the use of the obturator was discontinued. Figure 11 shows the opening to the cyst entirely closed and the case completed.

The entire time required for this repair was eight months.

In conclusion, the advantages of the Partsch approach for larger cysts is pointed out and the kindliness with which Nature seems to accept this simple, conservative treatment is emphasized.

U. S. Naval Training Center.

THE EFFECTS OF DIETARY DEFICIENCIES UPON THE ORAL STRUCTURES

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The Council on Dental Therapeutics has authorized publication of this report as one of the series on pharmacology and therapeutics. The opinions expressed are those of the authors and do not necessarily reflect the opinion of the Council.—*Donald A. Wallace, Secretary.*

The oral tissues are peculiarly sensitive to nutritional deficiencies and dietary aberrations. They are often the first to show the effects of such deficiencies, particularly if the latter are subclinical. The oral cavity mirrors the nutritional status of the body because of two unique characteristics:

1. The oral tissues range from the simplest (mucous membrane) to the most highly specialized tissue (the papillae of the tongue and the enamel and dentin). Hard and soft tissues of both epithelial (enamel) and connective-tissue (dentin and bone) origin may be observed side by side. A highly varied range of responses and types of tissue reactions may thus be seen at any one time. In addition, the oral tissues are constantly subjected to trauma and irritation by mechanical, thermal and bacterial agents and are therefore among the first to exhibit the effects of systemic disturbances.

2. The oral cavity is an internal cavity of the body, dark and moist, and lined by a true mucous membrane, which is continuous with the mucosa of the gastro-intestinal tract. It receives the secretions of specialized glands and plays an important role in digestion. Yet of all the internal cavities of the body, it is the only one that is readily accessible and easily examined without the aid of highly specialized instruments.

The oral tissues have been called the barometer of the state of nutrition of the body. Subclinical states are certainly not rare and, from the standpoint of diagnosis, perhaps the most important findings are in the mouth (Spies, 1942). The enamel and dentin are kymographic, fixed records of the past history of the individual. The alveolar bone, the gingivae and the tongue reflect the present internal status of the body accurately and quickly. The routine examination of the teeth, the gums, the tongue, the lips and the saliva at periodic intervals is a simple and fairly accurate method of determining the nutritional status of both the child and the adult.

Armstrong (1942), Marshall (1939), Mellanby (1928) and Schour and Massler (1942) have presented reviews on this subject.

Vitamin A Deficiency

Experimental.—The classic work of Wolbach and Howe (1925, 1933) on the dental changes in vitamin A deficiency has been confirmed and extended in the rat (Schour, Hoffman and Smith, 1941; Pohto, 1938; Helen Mellanby, 1939, 1941; King, 1938, 1940), in the guinea-pig (Pohto, 1939) and in the

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dog (King, 1936; Mellanby and King, 1934). Since most of our knowledge of the dental effects of vitamin A deficiency is based on findings in the continuously developing incisors of the rat, the effects in this tooth will, unless otherwise noted, be described.

It has been well established that the function of vitamin A is concerned primarily with epithelial cells and, in these cells, with the process of differentiation (Wolbach and Bessey, 1942). Vitamin A deficiency results in failure of the epithelial cells to differentiate. The basal cell layer, therefore, loses its type specificity and tends to produce a stratified keratinized epithelium regardless of the type previously formed. In addition, the failure to differentiate allows the basal cell layer to continue its proliferation unchecked. Thus, a keratinizing metaplasia results in numerous epithelial structures throughout the body (mucous membranes of the trachea, bronchi, conjunctiva, cornea, accessory sinuses, ureter, vagina, uterus and periurethral glands, as well as the skin). In the developing tooth germ, the first effect of vitamin A deficiency is found in the highly specialized odontogenic epithelium responsible for enamel formation and for directing the formation of dentin.

Odontogenic epithelium: The primary effect is seen as a failure of the young cells of the odontogenic epithelium to undergo normal histodifferentiation and morphodifferentiation (Schour, Hoffman and Smith, 1941). This results in persistence and increase in rate of cell proliferation, which in turn leads to an invasion of the pulp by proliferating epithelial cells. This epithelial invasion is characteristic of vitamin A deficiency (Schour, Hoffman and Smith, 1941).

In young rats the mothers of which were on a vitamin A deficient diet for five months preceding their birth, the changes are more severe, including a distortion in shape of the incisors and the molars (H. Mellanby, 1939, 1941).

Growing enamel: The mature enamel-forming cells of the odontogenic epithelium (ameloblasts) become small and disturbed in function so that the enamel matrix is arrested in formation and calcification. Enamel hypoplasia is therefore a common finding in the rat after prolonged vitamin A deficiency.

The normal orange pigment of the enamel, which is the final product of the ameloblasts, is lacking and the tooth has a paper-white, unglazed appearance (Smith and Lantz, 1933; Irving and Richards, 1939).

Growing dentin: One of the functions of the odontogenic epithelium is to organize and cause the differentiation of the subjacent mesenchymal cells of the pulp into odontoblasts. In spite of the fact that vitamin A deficiency affects epithelial cells primarily, the first recognizable histologic change is seen in the mesenchymal odontoblasts. Morphologic changes in the ameloblasts occur much later. although their function is affected before the odontoblastic changes are observed.

The odontoblasts on the lingual (cementum-covered) portion of the incisor show early atrophy and depolarization (Wolbach and Howe, 1933). As a result, the growth of the cementum-covered dentin is seriously affected. It is atypical in structure, lacks the normal tubular arrangement and contains cellular and vascular inclusions. Pohto (1938) has emphasized the peglike dentin projections into the pulp and the prominent foldings.

On the labial (enamel-covered) side of the incisor, the odontoblasts normally differentiate under the influence of the ameloblasts rather than under the less differentiated odontogenic epithelium. The odontoblasts on this side of the tooth appear to be normal and continue to lay down normal dentin long after the odontoblasts on the lingual aspects have disappeared. In fact, the

labial dentin becomes excessively thick in contrast to the abnormally thin lingual portion. The reason for this difference may be a selective alteration in the rate of dentin apposition. Instead of the normal rate of 16 microns per day, vital injections with alizarin red S indicate that the enamel-covered dentin shows an accelerated rate (up to 19 microns per day) and the cementum-covered dentin shows a corresponding decelerated rate (down to 6 microns per day) (Schour, Hoffman and Smith, 1941).

Pulp: The invasion of the pulp by odontogenic epithelium is characteristic of a chronic vitamin A deficiency. Amorphous dentin may be formed in the pulp as a result of the organizing influence of this aberrant epithelium upon the invaded pulpal mesenchyme.

Calcification of enamel and dentin: The enamel of the incisors appears dull white and opaque, while the incisal edge is short and blunt, this indicating deficient calcification of the enamel (Smith and Lantz, 1933).

The dentin presents an interglobular texture. King (1937) pointed out that calcification of the dentin was disturbed in his animals in spite of the fact that they were given ample quantities of vitamin D, calcium and phosphorus. The superposition of a vitamin D deficiency upon a basic diet deficient in vitamin A increases the disturbance in dentin calcification (Schour, Hoffman and Smith, 1941; Wolbach and Howe, 1933; May Mellanby, 1929; Irving, 1943).

Vital staining with alizarin red S produces a faint redness instead of the normally deep red (Schour, Hoffman and Smith, 1941). The teeth contain a lower total ash and a slightly lower percentage of phosphorus, but a higher percentage of calcium in the ash (Smith and Lantz, 1933). All these facts point to deficient calcification of both the enamel and the dentin in vitamin A deficiency.

Alveolar bone: Vital injections of alizarin red S indicate that the alveolar bone is retarded in its rate of formation (Schour, Hoffman and Smith, 1941). In the dog, there is an increased density of the alveolar bone due to the decrease in the rate of apposition. The roentgenograms show an ill-defined lamina dura (King, 1936).

The cementum is thickened. The periodontal membrane is irregular in width and abnormally enlarged in the fundic region of the rat incisor (Schour, Hoffman and Smith, 1941).

Eruption: Eruption is retarded (Smith, and Lantz, 1933) and ceases entirely in prolonged deficiency (Schour, Hoffman and Smith, 1941). In the dog, the teeth are also malposed and show malformed roots (King, 1936).

Gingivae: In both the dog and the rat, the gingival epithelium becomes hyperplastic and shows a marked increase in keratinization (May Mellanby, 1929, 1930; Helen Mellanby, 1941; King, 1940). The tissue is subject to invasion by bacteria, leading eventually to periodontal disease. In prolonged deficiency, deposits of calculus occur on the necks of the teeth (King, 1940).

Salivary glands: The major and minor salivary glands undergo the typical keratinizing metaplasia that characterizes all epithelial cells in vitamin A deficiency (Wolbach and Bessey, 1942). So far as we could ascertain, an analysis of changes in the quality of the saliva has not been made, although such studies would help to clarify the relation of vitamin A deficiency to dental disease.

Other oral changes: Green and Mellanby (1928) observed abscesses in the floor of the mouth and suppurating glands in the neck in 72 to 90 per cent of ninety-two rats deficient in vitamin A.

Effects of Replacement Therapy

Cellular: Wolbach and Howe (1933) found regenerative effects within seven days after feeding butter fat. The odon-

togenic epithelium and the odontoblasts resume their normal form and function. The ectopic epithelial cells in the pulp do not differentiate sufficiently to become ameloblasts, which might form enamel, but regain their organizing influence over the adjacent mesenchymal cells, which differentiate promptly into odontoblasts and form dentin (Schour, Hoffman and Smith, 1941). Excessive local formation of atypical dentin within the pulp thus increases with recovery. Morphologic recovery of the cells is complete within nineteen days after replacement therapy (Wolbach and Howe, 1933).

Pigment: Irving and Richards (1939) noted recovery in enamel pigmentation, which varied with different doses of replaced vitamin A.

Rate of growth: Measurements of the rate of dentin apposition by means of vital staining with alizarin red S show that the deviation from the normal rate of growth is in direct proportion to the severity and duration of the vitamin A deficiency. The rate of apposition also varies with the amount of replacement with vitamin A. The use of this sensitive dentin reaction as a biologic method of measuring the vitamin A content of foods has therefore been suggested (Schour, Smith and Hoffman, 1939).

Tumor formation: Long-continued, chronic vitamin A deficiency is made possible by intermittent feeding of minimal quantities of vitamin A. Burn, Orten and Smith (1941) observed tumor-like formations (odontomas) in and about the incisors in one-third of their experimental animals. These tumors arise as a result of the scattering of portions of the odontogenic epithelium in the surrounding soft tissues of the jaws. During the replacement feeding, these epithelial transplants differentiate and organize the adjacent mesenchymal cells in order to form dentin and therefore odontomas.

Vitamin A Deficiency in Man

Enamel hypoplasia: Vitamin A deficiency may cause a disturbance in the developing tooth germ only in children under 6 years of age, since, after that time, the crowns of all the teeth (with the exception of the third molars) are complete. Boyle (1933) described changes in the enamel organ of a tooth germ of an infant suffering from vitamin A deficiency. The changes were similar to those found in the rodent incisor. However, the suggestion that vitamin A deficiency is a common cause of enamel hypoplasia is not supported by findings other than the single case reported to Boyle. Bloch (1930, 1931) studied a number of children suffering from severe xerophthalmia and blindness caused by vitamin A deficiency. He found no dental changes. Investigation of the cause of enamel hypoplasia also does not support the assumption that vitamin A deficiency is a common cause. In fact, in sixty cases of enamel hypoplasia investigated by Sarnat and Schour (1941), not a single case of enamel hypoplasia was found to be associated with a vitamin A deficiency.

Oral epithelium: In the adult, the possible effect of vitamin A deficiency is limited to the oral epithelium. Vitamin A deficiency may result in hyperkeratotic changes in the oral mucosa similar to those found on other mucous surfaces. Abels *et al.* (1942) suggest a possible relationship between vitamin A deficiency and hyperkeratosis of the gingivae and oral leukoplakia. Hyperkeratosis of the gingivae has been interpreted clinically as resulting from vitamin A deficiency.

Caries: There is no definite evidence that caries is increased because of a deficiency in vitamin A (Day, 1944). Administration of supplements of vitamins A and D to children for a period of over one year has no significant effect on caries progress (Day and Sedwick, 1934). However, the diminished pro-

duction of lysozyme in most of the body fluids, with resulting loss of bacteriostatic action, may also occur in the saliva (Eddy and Dalldorf, 1941). The possible role of this factor in the saliva as a contributory cause in caries deserves investigation.

Hypervitaminosis A: Significant dental changes could not be found in experimental hypervitaminosis A (Wolbach and Bessey, 1942).

Vitamin B Deficiencies

Unlike the oral findings in vitamin A deficiency which are derived largely from animal experimentation, those in vitamin B deficiency are, for the most part, based on clinical observations in man. For this reason, the mechanism of action and many details of the histologic changes in vitamin B deficiency remain to be elucidated.

The effects of a deficiency of vitamins A, C or D, or of the minerals, are concerned chiefly with tooth and bone development. However, a deficiency in the B vitamins is concerned primarily with the oral soft tissues (gingivae, tongue and mucous membranes).

Thiamine (Vitamin B_1) Deficiency.— Thiamine deficiency in man is characterized by a marked sensitivity of the oral tissues (Mann *et al.*, 1941). Weisberger (1941) observed pinpoint vesicles resembling herpetic lesions on the buccal mucosa, under the tongue or on the palate, in elderly patients who were deficient in thiamine. These lesions healed after thiamine therapy. No typical glossitis was observed in experimental subjects studied by Williams *et al.* (1940).

Govier and Greig (1943) observed necrotic erosion areas in thiamine-deficient dogs. These lesions healed only after vitamin C was added to the vitamin B replaced. There is therefore reason to question whether these lesions were specifically caused by the thiamine deficiency. The experimental and clinical effects of thiamine deficiency upon the oral tissues need further elucidation.

Riboflavin (Vitamin B_2 Deficiency.— Ariboflavinosis is characterized by (1) a magenta area of glossitis, (2) cheilosis, (3) capillary dilatation and proliferation on the cornea of the eyes and (4) a seborrheic dermatitis of the nasolabial folds, alae nasi, eyelids and ears (Sydenstricker *et al.*, 1940) (Sydenstricker, 1941). When the quartet of these symptoms occur, the clinical diagnosis of ariboflavinosis is not difficult.

Ariboflavinosis is evidenced early in its course by a characteristic magenta pebbly area of glossitis, which is distinguishable from the smooth scarlet atrophic area of glossitis of pellagra and which disappears only after riboflavin therapy (Kruse *et al.*, 1942; Jeghers, 1942; Weisberger, 1941; Sydenstricker *et al.*, 1940). Ariboflavinosis also presents a characteristic cheilosis. Sebrell and Butler (1938) conducted an experimental study of eighteen healthy women placed on a riboflavin-deficient diet. After ninety-four to 130 days, thirteen developed a fissuring and maceration of the angles of the mouth (cheilosis) resembling perlèche. The lesions responded to additions of riboflavin to the diet, but not of nicotinic acid. These findings have been confirmed repeatedly (Rosenblum and Jolliffe, 1941) (Jolliffe *et al.*, 1939; Jones *et al.*, 1944). Jones *et al.* (1944) made a careful slit-lamp examination and analysis in the characteristic stomatitis caused by riboflavin deficiency in 1,746 men in an African army camp. The stomatitis was marked essentially by a painful glossitis (no magenta area) and a painful cheilosis with excessive salivation. The lesions responded to additions of riboflavin or fresh yeast to the diet, but not to additions of nicotinic acid.

While the exact mechanism involved in the production of both the glossitis and the cheilosis is somewhat obscure, the clinical stages have been clearly described and are readily recognized.

Glossitis: The glossitis begins, in mild deficiency, with soreness at the tips or lateral margins of the tongue. These sites become reddened and glazed as a result of atrophy of the filiform papillae. The fungiform papillae are engorged and flattened (mushroom shaped), giving the tongue a coarsely granular or pebbly texture. The lesions extend backward over the dorsum of the tongue in the form of ovoid patchy areas of desquamation. In a moderate, chronic deficiency, the entire tongue presents the characteristic granular glossitis. In severe cases, all traces of the lingual papillae disappear, leaving the tongue smooth, shiny and glazed. Fissures frequently develop. The tongue becomes atrophic, with sharp margins indented by the teeth.

Cheilosis: The cheilosis begins as a tiny raw, red painful area at the commissure of the lips, at the mucocutaneous junction. The area becomes larger and is soon covered with an adherent white epithelial membrane. In severe cases, painful multiple fissures develop. The lesion tends to spread to the lower lip, causing fissuring and cheilitis. It may also spread over the skin, but characteristically spares the upper lip. The gingivae are not affected.

Recent findings indicate that the cheilosis may not necessarily be specific for ariboflavinosis, but may depend somewhat on concurrent deficiencies in pyridoxine (Smith and Martin, 1940; Machella, 1942), nicotinic acid (Hou, 1941) or the entire B complex (Jeghers, 1942).

Pseudo-ariboflavinosis: Clinically, the glossitis and cheilosis of ariboflavinosis must be distinguished from the atrophic glossitis and pseudocheilosis resulting from closed bite in edentulous persons or in those with ill-fitting artificial dentures (Ellenberg and Pollack, 1942; Weisberger, 1941; Nippert and McGinty, 1943). Neither should traumatic fissures or monilial infections at the angles of the mouth (perlèche) be mistaken for the cheilosis of ariboflavinosis (Sulzberger and Cope, 1941; Jeghers, 1942). Sutton and Sutton (1939) suggest a causal relationship between cheilosis and perlèche. Although perlèche is a specific monilial infection, it may be superposed on or follow an underlying ariboflavinosis, just as a Vincent's infection may follow and be superposed on a pellagrous stomatitis.

Effect on bone formation: A possible role of riboflavin in skeletal development has been pointed out by Warkany and Schraffenberger (1944), who found many cases of congenital malformation, including cleft palate and impaired development of the mandible, in new-born rats the mothers of which were subjected to riboflavin deficiency. In a recent abstract, Ross (1944) reports a severe type of alveolar-crest atrophy and loosening of the incisors in young adult males suffering from riboflavin deficiency. The role of riboflavin in bone growth awaits further investigation.

Riboflavin deficiency in monkeys: Experimental multiple vitamin deficiencies in monkeys produced lesions of the gingivae, the periodontal tissues and the oral mucosa. The most severe changes (including noma) occurred in deficiencies of vitamin B_2 complex (Topping and Fraser, 1939; Tomlinson, 1939; Chapman and Harris, 1941).

Niacin Deficiency.—Glossitis: Niacin (nicotinic acid) deficiency is characterized by a typical painful fiery-red area of glossitis, which makes a spectacular and prompt disappearance after administration of nicotinic acid or its amide (Kaufman, 1943). In the earliest stage of niacin deficiency, the patients complain of weakness, lassitude, insomnia, headache, anorexia and loss of weight (Mann, Spies and Springer, 1941). They also complain of a burning sensation in the tongue (glossodynia) and oral mucosa. The tongue is swollen and reddened at the tip and lateral margins

and indented by the teeth. The lingual papillae are red and hypertrophied at this stage, giving the tongue a reddened appearance. Kirkland (1936) points out that few pellagrins fail to give a history of painful glossitis, gingivitis and stomatitis. Kruse (1942) has described minutely the lingual manifestations as observed with the aid of the biomicroscope in mild cases of aniacinosis. None of his cases showed skin lesions.

In the acute stages of niacin deficiency, the entire oral mucosa becomes vascular and fiery red. The tongue becomes tender and painful and the entire mouth feels painfully scalded. There is excessive salivation. In the more advanced cases, the lingual papillae completely disappear, leaving the tongue smooth, dry and glazed. The tongue literally sheds its epithelial skin, beginning at the tip and lateral margins.

Gingivitis: In contrast to riboflavin deficiency, the gums and gingivae are also attacked. One of the earliest symptoms of a niacin deficiency is a painful gingivitis and stomatitis. The condition begins with the interdental papillae and progresses very rapidly and extensively, the gingivae becoming tender and painful and often ulcerating. The ulcerated areas usually present a thick grayish exudate or membrane, which gives rich cultures of Vincent's organisms, and may spread to the entire oral mucosa. Vincent's infection appears in direct proportion to the severity of the deficiency and subsides after adequate niacin therapy (King, 1940). King (1940) found that the most effective treatment is administration of niacin and local hygienic measures.

Dermatitis: In persons with these oral symptoms, the presence of a characteristic dermatitis (confluent red-brown areas with sharp margins, bilateral symmetry and keratosis) is ample evidence of a niacin deficiency (Kirkland, 1936).

King (1940) and Kaufman (1943) have shown that an atypical pellagra (pellagra *sine* pellagra) may occur. The symptoms in these cases are neither so severe nor so constant as in the typical pellagrin, consisting principally of vague neuropsychiatric complaints and a relatively mild stomatitis with atrophic burning glossitis (glossodynia) (Manson-Bahr and Ransford, 1938; Cleckley *et al.*, 1939; Jolliffe, Bowman, Rosenblum and Fein, 1940). The symptoms disappear after niacin therapy.

Secondary pellagra: Although typical pellagra is not common, in the northern states (Field *et al.*, 1940) secondary pellagra is rather common and widespread (Kaufman, 1941; Bean, Spies and Blankenhorn, 1944). Loss of teeth, partial or complete, dental infection, periodontal disease, tooth extraction, fractures and tumor of the jaws and painful stomatitis are often important conditioning factors in secondary pellagra. The patients are frequently obliged to substitute a soft diet, consisting mainly of soups, mush and cooked cereals for a balanced one containing meats and uncooked vegetables (Bean, Spies and Blankenhorn, 1944).

Experimental niacin deficiency: Black tongue has been found among dogs owned by families suffering from pellagra, since these animals live on scraps of the same food that their masters eat (Spies *et al.*, 1938). This condition is marked by glossitis and stomatitis similar to that found in human pellagra. The stomatitis, which tends to be severe and ulcerative, is quickly cured by niacin. The lesions in the mouth often appear before the other general symptoms (Denton, 1928; Eddy and Dalldorf, 1941), first as areas of redness on the floor of the mouth, on the cheeks or along the inner side of the upper lip. As the deficiency becomes more severe, these areas become dark red and they are finally covered with a greenish gray membrane, due to a superficial necrosis of the oral epithelium. Once the necrosis begins, *fetor ex ore* and drooling appear. The

mouth may become entirely covered with pustules and so foul as to resemble rotten meat (Chittenden and Underhill, 1917).

Pyridoxine (Vitamin B_6 Deficiency).—Rosenblum and Jolliffe (1941) have described a specific edematous magenta glossitis that responds only to pyridoxine therapy. The possibility of a concurrent riboflavin deficiency has been considered.

Pantothenic Acid Deficiency.—Becks and Morgan (1942) and Becks, Wainwright and Morgan (1943) describe the effects in dogs of a deficiency of the entire filtrate fraction of the vitamin B complex, which they consider to contain pantothenic acid plus one or more unknown essential elements. The deficiency leads to severe gingival inflammation, necrosis and finally desquamation of the oral epithelium, as well as osteoporosis and progressive marginal atrophy of the alveolar bone. The supporting spongiosa is porotic and replaced by fat tissue. The clinical and histologic appearance of the alveolar atrophy resembles the atrophic type of periodontosis observed in man. The authors caution against generalized conclusions, since only one or two animals were used in each experiment and since man may not react as does the dog. Becks and his co-workers appear to have felt that all these changes were not caused by a deficiency in pantothenic acid alone, since the addition of crystalline pantothenic acid to the diet deficient in the entire filtrate factor did not completely protect the oral tissues against the pathologic changes.

Ziskin *et al.* (1944) observed oral lesions consisting of fissures with crusting at the angles of the mouth and ulcers on the buccal mucous membranes and on the tongue in rats on a low pantothenic acid diet supplemented with additions of zinc carbonate.

Vitamin B Deficiency and Oral Disease.—Caries: Kniesner, Mann and Spies (1942) found a low incidence of dental decay in pellagra. This is true in spite of the generally poor oral hygiene and high carbohydrate diets. The fact that thiamine is essential to bacterial growth and carbohydrate metabolism may explain the inverse relationship between vitamin B complex deficiency and dental decay.

Periodontal disease: Although the incidence of caries was found to be low in pellagra, that of periodontal disease is high (Mann *et al.*, 1941; Bean *et al.*, 1944).

Oral cancer: Martin and Koop (1942) believe that "the most frequent and probably the most important form of chronic irritation, from the standpoint of cancerigenesis in the oral mucous membranes, is that of avitaminosis B." They also point out that the lesions of avitaminosis B are not confined to the mouth, but affect the entire gastrointestinal tract and therefore may also play a role in the etiology of gastric and intestinal cancer.

The possibility that vitamin A deficiency may also play a role in oral cancer must be considered in view of the characteristic metaplasia of epithelial cells.

Glossodynia: A measurable proportion of patients in the older age groups who complain of abnormal oral sensations (glossodynia and abnormal taste sensations) respond favorably to therapy with vitamin B complex. Occasional cases respond specifically to niacin or to thiamin therapy. In man, the deficiency is usually multiple, rarely single.

Vincent's infection: The relation between vitamin B deficiency, more particularly niacin deficiency, and Vincent's infection of the gingivae and other oral tissues has often been noted (King, 1940). Vincent's infection often follows a niacin deficiency, but niacin deficiency is only one of many systemic conditions that predispose to Vincent's infection.

Herpetic infections: Gerstenberger

(1923) and Burket and Hickman (1942) report the prompt and often dramatic response of herpetic lesions to vitamin B complex therapy. In some instances, thiamine chloride alone was effective (Burket and Hickman, 1942). Weisberger (1941) observed herpetic-like lesions in thiamine-deficient patients.

Herpetic lesions (herpes labialis, solitary and recurrent aphthae, herpetic stomatitis and herpes genitalis) are specific infections caused by the presence of herpes simplex virus and, like Vincent's infection, are not a specific symptom of vitamin B deficiency. Therefore, not all cases will be improved by vitamin therapy (Burket and Hickman, 1942). There is evidence that one of the important predisposing factors in many cases of both Vincent's and herpetic infection is an underlying vitamin B deficiency.

Vitamin C Deficiency

Experimental.—Vitamin C seems to play a primary role in the differentiation of connective-tissue cells, and therefore in the capacity of these cells to form and maintain specialized intercellular substances secreted by connective tissue cells (Aschoff and Koch, 1919; Wolbach and Howe, 1926). Those oral tissues that are mesenchymal products (dentin, bone, periodontal membrane) or the integrity of which depends particularly on their vascular supply (gingivae) are primarily affected. The dental changes described below apply largely to the continuously developing incisors of the guinea-pig, which has been the animal of choice in studies of scurvy (Wolbach and Howe, 1926; Boyle, Bessey and Howe, 1940; Hertz, 1936). The periodontal changes have been described in man (Brinch, 1937; Weston, 1925, 1931), in monkey (Tomlinson, 1930, 1942; Topping and Fraser, 1939) and in the guinea-pig (Boyle, Bessey and Wolbach, 1937).

Pulp and growing dentin: The earliest dental effect is a disturbance in the histodifferentiation of the odontoblasts. These specialized connective tissue cells atrophy, become disorientated and are disturbed in function in even mild deficiency states. The vessels of the pulp are dilated and hemorrhagic.

The characteristic disability of the specialized mesenchymal cells to form intercellular substances results in an amorphous and irregular dentin, which has been variously called osteodentin, pulp bone and calcific scar (Fish and Harris, 1935). The dentinal cells are few and irregularly arranged. Atrophic cells of the pulp may become enclosed in the matrix, simulating secondary dentin in man. Eventually, the dentin stops forming and, as a result, the predentin (the newly deposited layer next to the pulp) becomes hypercalcified. This apparent overcalcification of the predentin is secondary to the arrest of dentin formation (Wolbach and Bessey, 1942).

In severe chronic deficiency, the odontoblasts become morphologically indistinguishable from other pulpal cells (Boyle, Wolbach and Bessey, 1936). Boyle, Bessey and Howe (1940) have pointed out that these changes are not unlike those normally found in the oldest or incisal portions of the continuously growing incisor tooth wherein the odontoblasts have completed their lifespan and undergone senile atrophy. In vitamin C deficiency, these regressive cellular changes are of greater intensity and they occur at the younger, formative end of the incisor.

The histologic changes mentioned above are consistent and so characteristic in their sequence that histologic examination and grading of these changes have provided a biologic method for the assay of vitamin C (Hojer, 1924; Key and Elphick, 1931).

Fish and Harris (1934) believe that the dental changes are the direct result of primary premature degeneration of the odontoblasts. They regard the presence of calcified predentin and calcific

deposits in the pulp as a secondary effect and call them calcific scar tissues. They assert that whenever the odontoblasts degenerate and lose their dentinal fibrils, the pulp attempts to seal off the dead primary dentin by such calcific scar tissue.

Rate of dentin apposition: Boyle, Bessey and Howe (1940) found, by means of vital staining with alizarin red S, that in the guinea-pig dentin formation is retarded and eventually ceases in advanced deficiencies.

Enamel epithelium and growing enamel: Atrophic changes in the enamel epithelium and enamel hypoplasia appear considerably later than changes in the odontoblasts (Boyle, 1938). Boyle (1938) points out that the atrophy of the enamel epithelium is caused by traumatic injury to the enamel organ. The lack of collagen-fiber formation in the periodontal membrane weakens that structure on the lingual surface of the tooth and leads to failure to resist incisal stresses, so that injury to the enamel epithelium on the labial surface results. This is in contrast to the views of Fish and Harris (1935), who believe that the atrophy of the enamel epithelium is caused directly by vitamin C deficiency.

Alveolar bone and periodontal membrane: The osteoblasts lose their ability to form bone and the fibroblasts to form collagenous fibers. This results in weakening of the structures supporting the tooth and in porosis and atrophy of the alveolar bone, which is replaced by connective tissue (Westin, 1925; Harmon, Kramer and Kirgis, 1938).

Occlusal stresses are normally resisted by the fibers of the periodontal membrane. In vitamin C deficiency, the periodontal fibers rupture easily, with the result that the tooth impinges on the weakened atrophic alveolar bone, which becomes resorbed. The teeth thus lose their ability to withstand normal occlusal stress, become loose and may be easily extracted (Boyle, Bessey and Wolbach, 1937). These changes have been considered to be similar to those characteristic of systemic periodontosis (diffuse alveolar atrophy) in man (Boyle, Bessey and Wolbach, 1937; Brinch, 1937).

Gingivae: In the continuously growing incisors and molars of the guinea-pig, the periodontal tissues are replaced rapidly, so that the scorbutic effects are usually not so outstanding as in the monkey and in man. In addition, the striking changes in the pulp and growing dentin have diverted attention from the changes in the periodontal tissues. Boyle, Bessey and Wolbach (1937) observed that the gingivae of the scorbutic guinea-pig were congested, but that there was no pocket formation.

Westin and Kalnins (1938) succeeded in producing scurvy in the rat in spite of the ability of this animal to synthesize vitamin C. They describe severe disturbances in the periodontal tissues of both the continuously growing incisors and the molars, which, like those in man, are of limited growth. They observed a marginal gingivo-alveolar osteitis and osteomyelitis, the extent and severity of which were in direct proportion to the length of the experimental period. In 162 days of vitamin C deficiency, the alveolar process around the molars was completely destroyed and the teeth were lost. The changes in the incisors, because of their continuous growth and development, were much less severe.

Eruption: Dalldorf and Zall (1930) have reported retardation in the eruption of the incisors of guinea-pigs. They and others (Eddy, 1931) suggest the use of the rate of eruption as an index of the degree of scurvy.

Changes in monkeys: Tomlinson (1942) observed a marked hyperemia and hypertrophy of the gingivae in four vitamin C deficient and four vitamin C and calcium deficient monkeys. The free margin of the gingivae became so hypertrophied as to cover the entire crown

of the teeth. Food débris tended to accumulate and a foul odor resulted. In severe cases, areas of the free gingivae became necrotic and the teeth became loose. Subperiosteal hemorrhage lifted the soft tissue from the underlying bone.

The hemorrhage and necrosis extended for a short distance into the periodontal membrane, which was markedly deficient in fibers. The alveolar bone was thin and showed many areas of subperiosteal hemorrhage and abnormal resorption, but no necrosis. The bone marrow was edematous and contained an increased number of young fibroblasts, but was markedly deficient in fibers. Extensive hemorrhage also occurred in the joints, including the temporomandibular joint, and in the growing epiphyseal plates, causing the latter to separate and eventually disappear.

Those animals that were placed on a diet deficient in both vitamin C and calcium showed less severe changes than those deficient in vitamin C alone. Vitamin C therapy relieved the earlier symptoms, but there was no recovery of the interdental papillae or other tissues that had advanced to the stage of necrosis; nor was there a tendency to reattachment of the separated gingivae (Fraser and Topping, 1942; Fraser, 1942).

Factors in vitamin C deficiency: Increased stress. Dalldorf and Zall (1930) observed more advanced changes when the teeth of animals deficient in vitamin C were under increased occlusal stress. This fact is particularly important in man.

Pregnancy. Scorbutic guinea-pigs show more pronounced changes during pregnancy. The effects are more severe in the continuously growing teeth of the mother than in the young (Day, 1933). The relation of vitamin C deficiency to pregnancy in man has not been adequately studied.

Toxins. King *et al.* (1940) found that administration of diphtheria toxin to guinea-pigs caused marked injury to the odontoblasts and affected dentin formation. Administration of 5.0 mg. of ascorbic acid per day protected against injury. The effect of toxic states in man in the production of dental and oral lesions has been noted often, but has not been adequately studied, particularly in relation to increased vitamin C needs.

Replacement therapy: Boyle, Wolbach and Bessey (1936) observed that the pulpal cells differentiated promptly after even partial replacement therapy. However, instead of the normal dentin deposited in normal incremental layers arranged parallel to the pulpal surface, an irregular bonelike dentin is deposited in the pulp in the form of long spicules projecting toward the center of the pulp cavity. These spicules represent a partial recovery of the dentin-forming cells. When the odontoblasts had survived the vitamin C deficiency and the replacement was adequate, dentin formation became normal as to structure and proceeded at a normal rate (Boyle, Wolbach and Bessey, 1936).

Boyle, Bessey and Howe (1940) found that in guinea-pigs deficient in vitamin C, the amount of dentin deposited in the formative end of the incisor varies directly with the amount of ascorbic acid administered. They suggest the possibility of utilizing this reaction as an objective, biologic assay for the determination of the vitamin C content of foods.

Vitamin C Deficiency in Man.—Growing teeth: Boyle (1934) examined the teeth of two scorbutic infants and found none of the changes described in the growing dental tissues of a scorbutic guinea-pig. One infant showed small cysts in the enamel organ and areas of slight hemorrhage. Boyle explains the absence of the characteristic changes on the basis that human teeth grow much slower and that unerupted teeth are free from functional stresses. There may of course be a basic difference in the reaction of human and other species. There has been no human demonstration of

the changes observed in the growing dental tissues in the guinea-pig (Wolbach, 1937).

Eruption: Pediatric texts frequently state that the eruption of teeth is delayed in scorbutic infants. In our experience, scorbutic infants show an accelerated eruption of the teeth.

Adult teeth: Westin (1925, 1931) made a detailed and comprehensive histopathologic study of eighteen human adults suffering from various degrees of scurvy. The enamel showed no changes. The pulp was hyperemic and edematous and contained secondary dentin in various formations. Calcified or necrotic areas were also present. The odontoblasts showed degeneration. The dentinal tubules underwent porotic changes, which Westin regards as dentinolysis.

Gingivae: The effects of vitamin C deficiency in man are confined largely to the continuously growing periodontal tissues, the enamel and dentin rarely being affected. When the teeth are not yet erupted or have been extracted, the marginal gingiva, the alveolar crest and the organized periodontal membrane are nonexistent, and therefore the effects on the periodontal tissue are absent. Unlike a vitamin B deficiency, scurvy rarely affects the tongue, lips or buccal mucosa.

Scorbutic gingivitis. The first clinical evidence of latent scurvy in man is seen as hyperemia and swelling of the interdental and marginal gingivae, which become tender and bleed on the slightest trauma (Kruse, July 1942).

In mild acute cases, the subsurface capillaries become engorged and dilated so that the gingivae are a violent red and, in moderate cases, swollen, giving the surface a smooth, shiny, dark red appearance. The process begins on the interdental papillae and soon involves the marginal (free) gingivae, forming a swollen collar around the teeth that bleeds easily on slight trauma and is sharply demarcated from the purplish alveolar (attached) gingivae. The gingival crevice is enlarged to form a pocket, which soon is filled with débris and calculus and which, in turn, irritates the gingivae and aggravates the condition.

In fully developed acute scurvy, the gingivae become boggy and are soon denuded of epithelium, showing dilated thin-walled and easily ruptured blood vessels. The gingivae change rapidly to a violaceous red. The alveolar (attached) gingivae may also become involved until the gums are greatly swollen. In infants, the swollen tissue may entirely cover the newly erupted deciduous teeth. In severe acute cases, hemorrhage tends to be spontaneous and the pain is constant and intense. The gingivae may become ulcerated and secondarily infected with Vincent's organisms.

In mild chronic scurvy, the subsurface capillaries undergo relatively slight dilatation and engorgement. The interdental papillae and the marginal gingivae become swollen and edematous, but not reddened. Atonia of the marginal gingivae is marked, so that they tend to fall away from the teeth. This results in gingival pocket formation and the accumulation of débris, from which a distinctly foul odor emanates. The marginal gingivae form a spongy and edematous collar, which tends to recede from the necks of the teeth.

In severe chronic cases, the swollen gingival collar may become covered with small ulcers and granulation tissue. At the same time, hemorrhage and swelling of the periodontal membrane occur, followed by rarefaction and loss of the alveolar bone. As a result, the teeth soon become loosened and fall out.

Kruse (July 1942) gives an excellent detailed description of the foregoing changes in acute and chronic scorbutic gingivitis as seen with the aid of the biomicroscope.

Local factors, particularly trauma, calculus and lack of hygiene, undoubtedly play a significant role in the progress of scorbutic gingivitis and the perio-

dontal breakdown, since these lesions begin and are obvious only at sites of irritation and stress. They do not occur at all if the teeth are unerupted or absent. A similar situation obtains in other types of systemic gingivitis and periodontal disease, such as lead lines and diabetic gingivitis (Schour and Sarnat, 1942).

Vitamin C Deficiency and Dental Disease.—Gingivitis: Gingivitis is a common disease, affecting more than 75 per cent of all adults to some degree. It is caused for the most part by local conditions such as lack of hygiene, the presence of calculus and trauma. In view of the facts that vitamin C deficiency predisposes to gingival disease and that latent scurvy shows a wide prevalence (30-65 per cent) among persons who are on an apparently adequate diet (Youman's Text, 1943), the possible systemic role of vitamin C deficiency in gingivitis cannot be neglected.

While vitamin C deficiency has frequently been cited as an underlying cause in gingivitis (Kruse, July 1942; Burrill, 1943; Bleckley and Benziger, 1942; Stuhl, 1943), many investigators found no correlation between low blood plasma levels of ascorbic acid and the average case of gingivitis. (Radusch, 1942; Riggs, Perry *et al.*, 1943; Restarski and Pijoan, 1944; Herlitz, 1939) and many obtained no therapeutic results from large oral doses of vitamin C (Day and Shourie, 1943). Moreover, in spite of the recognized increase in vitamin C intake in the United States, there has been no apparent decrease in the incidence of gingivitis (Radusch, 1941). On the other hand, when the gingivitis is caused by a latent or subclinical, but demonstrable vitamin C deficiency, treatment with ascorbic acid has excellent results (Roff and Glazebrook, 1940; Stuhl, 1943; Kent, 1943).

Additional as well as better controlled investigations are needed in order to supply conclusive evidence on this important, but controversial problem.

Vincent's infection and scorbutic gingivitis: A secondary Vincent's infection may be superposed on scorbutic gingivitis (Stuhl, 1943; Kent, 1943), which is distinguished from primary Vincent's infection by the fact that (*a*) the ulcers are small and localized to the marginal gingivae, (*b*) there is no lymphadenopathy and (c) there is a dramatic response to vitamin C therapy (Kent, 1943).

Periodontal disease (alveolar bone and periodontal membrane): The possibility of vitamin C deficiency as the etiologic agent in periodontal disease has been pointed out many times (Brinch, 1937; Westin, 1925, 1931; Blockley and Benziger, 1942; Campbell and Cook, 1942; Weisberger *et al.*, 1938; Boyle, Bessey and Wolbach, 1937*a* and *b*), but vitamin C therapy in patients suffering from periodontal disease has not been attended with conspicuous success (Radusch, 1942; Burrill, 1942).

Boyle, Bessey and Wolbach (1937) point out the similarity between experimental and clinical scurvy and diffuse alveolar atrophy as regards the histopathology of the attachment apparatus. Westin (1925; 1931) has described the changes in the periodontal tissues in human scurvy as (1) marked widening of the periodontal space, (2) resorption of the cementum and alveolar bone, (3) hemorrhage, (4) osteoporosis and disappearance of hematopoietic tissue. There is no pocket formation.

Weisberger *et al.* (1938) reported direct correlation between low blood ascorbic acid levels and periodontal disease. Boyle, Bessey and Wolbach (1937) recommended blood tests for ascorbic acid in all cases of periodontal disease. Negative findings have also been reported (Burrill, 1942; Radusch, 1942).

In a study by Crandon, Lund and Dill (1940), one of the authors subjected himself to vitamin C deficiency and found that the earliest changes that could

be observed were in the dental roentgenograms, which showed slight but definite interruptions in the lamina dura (alveolar bone proper). These authors therefore suggest that roentgenographic observation of the lamina dura be used as a criterion in the diagnosis of incipient scurvy.

There is no doubt that vitamin C is as necessary for the maintenance of periodontal tissue as it is for rapid wound healing. However, although the relation of vitamin C deficiency to gingivitis may be postulated on the basis of a subclinical deficiency, periodontoclasia is a rather severe type of tissue destruction and should be attended by other evidence of a frank deficiency before it may be regarded as a disorder of scorbutic origin (Restarski and Pijoan, 1944).

Caries: Claims that caries may be controlled or arrested by vitamin C therapy have not been substantiated. As far as can be determined, there is no relationship between vitamin C deficiency and caries (Westin, 1925), nor is vitamin C therapy effective in arresting caries (Grandison *et al.*, 1942). Westin (1925) found no case in the guinea-pig, monkey or man in which scurvy had been a determining factor in the development of caries. Grandison, Stott and Cruickshank (1942) found no significant effect on dental caries from daily administration of 200 mg. of synthetic vitamin C to twenty children for two years.

Vitamin C in extraction wound healing: Campbell and Cook (1942) observed in eight cases that vitamin C given before, during or immediately after tooth extraction dramatically accelerated the healing of extraction wounds. In addition, they observed less postoperative pain and bleeding.

(End of Part I)

FURTHER TESTIMONY IN HEARINGS ON NAVAL DENTAL BILL

Mr. MAAS. You would not want by statute to say where the commanding officer has to use them? You would give him that right, would you not?

Admiral MCINTIRE. That is exactly right, and we are not going to take a chance like that, because we try to man the ships already in the fleet in an organization so that we know at least to start with that they have the right number of officers and the right number of corpsmen trained to handle their battle stations and to take care of all of the battle casualties. So, what I am simply saying is this, we are going to add more enlisted personnel in the Medical Department.

Mr. MAAS. How many more would you have to add?

Admiral MCINTIRE. In some ships only five or six men.

Mr. MAAS. On your big ships you would add about five or six? I doubt if you would have to add that number.

The marines on board ship have a commanding officer, but would they not serve under a gunnery officer on board ship? Their battle stations may be at the guns, and many of them are at the guns. They have their battle stations aboard ship. There is no conflict there. The commanding officer of the ship assigns them wherever he wants them to serve, but they have their own commanding officer for administrative and disciplinary purposes. Nobody would think of changing that.

Admiral MCINTIRE. All right, probably you would still get back to the same old question of personal grievances.

Mr. MAAS. Well, I have seen personal grievances within a department on board ship.

Admiral MCINTIRE. Well, that is what we are supposed to have now.

Mr. MAAS. Yes.

Admiral MCINTIRE. And what we are trying to get out from under on this.

Mr. MAAS. I have seen grievances between personnel in the gunnery department, and personnel in the supply department.

Admiral MCINTIRE. Yes; that is very true.

Mr. MAAS. And the commanding officer or the executive officer has to reconcile it on board ship. I think it is just merely a question of adjusting yourselves. I cannot see any-

thing fundamental in this. Now, going to the question of corpsmen, the dentists do not control their corpsmen. The corpsmen come under the medical officer.

Admiral McINTIRE. Yes; under the medical officer.

Mr. MAAS. The dentist does not control his own personnel. He cannot assign them. He cannot select the personnel he wants to serve under him, and any time the medical officer wants to transfer them, he does transfer them, doesn't he?

Admiral McINTIRE. Yes; theoretically he could do it; yes; but he is not going to take out dental technicians and put in untrained men.

Mr. MAAS. You have other corpsmen besides just dental technicians. You cannot run a dental department with just dental technicians, can you?

Admiral McINTIRE. Yes.

Mr. MAAS. You have corpsmen in addition to them?

Admiral McINTIRE. No. That is what this bill wants. In other words, you are not going to have hospital corpsmen. That is the point I am getting at.

Mr. MAAS. They would be called by another name, but they would function just the same?

Admiral McINTIRE. But their training is going to be entirely different because their duties will be different.

Mr. MAAS. There are a considerable number of corpsmen who are with the dentists and still used in dentistry?

Admiral McINTIRE. And that is the way it should be, in my estimation.

Mr. MAAS. Why not have them remain with the dentists?

Admiral McINTIRE. All right; but I am thinking about a healthy organization, and again I say it is a great mistake to get too highly specialized in your enlisted and commissioned personnel.

Mr. MAAS. Admiral, you as an eminent doctor would say that the spiritual side of health is very important too, is it not; it plays a great part, does it not?

Admiral McINTIRE. There is no question about that.

Mr. MAAS. Then why should not the chaplains be under the Medical Department? That is a very important part of health, mental health, spiritual health.

Admiral McINTIRE. It is a little broader than just what you would describe.

Mr. MAAS. It is a part of health department.

Admiral McINTIRE. Well, we would be glad to take them and train them technically, and it would be all right.

Mr. MAAS. Did you ever assign dentists as the head of a medical department on a station or ship?

Admiral McINTIRE. That has been done on one of our combatant ships. Two years ago one young dentist took over the department.

Mr. MAAS. I did not ask you if he took over command because of a battle casualty. I meant in the ordinary line of succession. For instance, if a medical officer is ordered away and the next officer in seniority is a dentist does he become head of the department?

Admiral McINTIRE. No; that has not been done.

Mr. MAAS. Why?

Admiral McINTIRE. There is no reason why it could not happen.

Mr. MAAS. Do you think that because he is a dentist, he cannot command anything? You know 90 per cent of incentive in the military service is rank and command.

Admiral McINTIRE. Medical officers command nothing aboard stations.

Mr. MAAS. They command all of their enlisted personnel. When you come right down to command, nobody commands but the commanding officer, but you have a head of the medical department on a ship, but not a head of the dental department.

Admiral McINTIRE. No; that is correct; because there is not any dental department. There is a medical department.

Mr. MAAS. There would be a dental department if you set one up.

Admiral McINTIRE. Yes; that is very true.

Mr. MAAS. Where you have two or more dentists, and where we have stations where we have a number of dental technicians, the dental technicians do not go to their commanding officer, a dentist, and the junior dental officer does not go to a dentist who understands his problem, but he goes to the medical officer?

Admiral McINTIRE. No; he does not do it that way.

Mr. MAAS. They all come under the medical officer, do they not?

Admiral McINTIRE. The junior dentist works through his senior dentist.

Mr. MAAS. He works through his senior dentist, and he works under the director of the medical department, and yet he cannot deal with him at all without dealing through the senior dental officer.

Admiral McINTIRE. He could do it, but they do not do that.

Mr. MAAS. I know of cases where they have done it.

Admiral McINTIRE. But it is pretty rare.

Mr. MAAS. It is my experience that the enlisted personnel and the dental officers all come under the medical director of the station for disciplinary purposes, leave, promotions and everything else.

Admiral McINTIRE. You have to have the head of a department because it would be a rather strange thing if the head of a department did not supervise his whole department as long as he has that ability and is given that responsibility. In fact, I would think he was running a very bad department if he did not do that as long as it is set up that way.

Mr. MAAS. That is true, but we are talking about giving the same opportunity to both.

Admiral MCINTIRE. All right; if you are going to give them the same opportunity, I think probably, as one of the dentists who came up here suggested, it might be better to set them up as completely separate. It is the only way that I can see that you are going to do it unless you expect them to take a very definite part in the whole organization, and if you are going to do that you have got to have some head.

I do not say that is absolutely essential, although I am opposed to setting up a separate dental department.

Mr. MAAS. The Marine Corps has its aviation department, it has its own commanding officer, the director of aviation, and there is not any conflict. Every aviator is administered by another aviator up through the commanding officer, up to the director, and there is no conflict there.

Admiral MCINTIRE. No; but his duties are considerably different.

Mr. MAAS. But every aviator has that opportunity to look forward to command. A dentist can look forward to commanding no one.

Admiral MCINTIRE. All right; I will grant you that human nature always wants that right, and I have not any complaint on that side of this subject, none at all. I do not blame a man for wanting that.

Mr. MAAS. Ninety per cent of the incentive in the military service is rank and command, and every officer who has anything at all to him looks forward to the day when he can command something. Otherwise he would not go into the military service. Even a chaplain has charge of the chaplain's department. He may have only one or two enlisted men, but he has something he can call his own, but the dentist has nothing yet. Even the equipment he gets, even his supplies he has to ask somebody else for, somebody else who must approve them for him.

Now, how do you think the doctors would feel about going to a dentist and asking him for leave to go ashore, or having the dentists make out their fitness reports? They unquestionably would not like it.

Admiral MCINTIRE. I think probably we would not.

Mr. MAAS. You would say, "What does a dentist know about how good a doctor I am," and the same thing in reverse is true as to the dentists.

Admiral MCINTIRE. It is true in a certain manner; yes; but again you are putting this question of dentistry in a very narrow line. I know a lot of dentists feel that way about it. They feel they should be put down into that narrow field, but I do not think so. I think they should be made a real specialty where they get into the broader field of medicine.

Mr. MAAS. If you would do that, it would be something. But you have never done that. If you would let the dentists be considered as full and equal members of the Medical Corps and permit them to succeed to command and be on a seniority basis, the same as anybody else, and if they were treated just as medical officers are, that would be one thing. You would not have any such bill before you. But you do not propose to do that, do you? It is your own doctors who would be the first to kick about such a proposal if you were to issue regulations to that effect. You ought to do either one thing or the other. You ought to treat dentists as medical officers for the purposes of command, or you ought to give them a separate and parallel opportunity for it themselves. Who makes out the fitness reports of the dentists?

Admiral MCINTIRE. It all depends on where they are. Of course, on board ship the dental officer sends in his recommendations, and they are forwarded up to the commanding officer of that ship by the medical officer who is head of the department.

Mr. MAAS. The medical officer makes the fitness report?

Admiral MCINTIRE. The commanding officer makes out the fitness reports.

Mr. MAAS. We know he signs them.

Admiral MCINTIRE. Well, all right. Now, I do know that he signs all of them. I have seen some commanding officers who like to make out their own fitness reports.

Mr. MAAS. That is right; but for all practical purposes the recommendations that finally become the fitness report of the dentist are made, suggested or recommended by the senior medical officer?

Admiral MCINTIRE. I disagree with you completely, because I have had plenty forwarded through me, and I have yet to find the time when I would disagree with the senior dentist on what he thought of his juniors, because I have no way of knowing. Any medical officer who is that narrow is a pretty poor officer.

Mr. MAAS. But you are a very broad-minded officer.

Admiral MCINTIRE. Not a bit. I will put it on the other side. The exception comes in the medical officer who is that narrow. I want to see our dental officers do the best they can, and a great deal of what you have said is quite true. Again, I go back to human nature, because it is all the same; it does not make any difference what you say.

The CHAIRMAN. Are there any further questions?

Mr. MAAS. I think the admiral has not finished.

Admiral MCINTIRE. I think it would be more of the same.

Mr. MAAS. Then, I shall finish up with this: If you will issue regulations and work things out in the Medical Department so that a dentist is for all practical purposes—not, of course, to practice medicine, but for

all military purposes—treated on an absolute basis of equality with medical officers, then I would see no need for this bill. But I think you ought to do it one way or the other. You ought, for military purposes, treat dental officers as medical officers or else give them the opportunity for their own chance to command.

The CHAIRMAN. Are there any questions by any other members?

Mr. MOTT. I think I have got all the views of the admiral. I just want to make sure. I have known for a long time, Admiral, that you are a great medical officer and a great administrator. However, if I had never known that before, I would have discovered it by your statement here and your answers to the questions which have been asked. I also think that you are a great conciliator, and that if this bill goes through in proper shape—and I think we all admit it is not in proper shape—you will have no more trouble with it than you did with the bill creating the grade of admiral, to which you made far more objection. Your objection is to the administrative side of it, as I see it, from your statement and your answers to the questions. Your principal objection to the bill is an administrative objection.

Admiral MCINTIRE. Purely.

Mr. MOTT. You said you thought there would be some trouble in regard to the shift from a medical to a dental set-up, which could be overcome, I suppose, and it would involve some administrative difficulties in bookkeeping. But that is not insurmountable.

Admiral MCINTIRE. No; that is not insurmountable. I may point out other difficulties, because, after all, I am the one who is going to have to take it when it is finally finished.

Mr. MOTT. This will be under your jurisdiction?

Admiral MCINTIRE. Yes.

Mr. MOTT. You thought there would be a duplication of handling administrative personnel and possibly a duplication of financial work. But those are administrative difficulties——

Admiral MCINTIRE. Exactly.

Mr. MOTT (continuing). Which one like yourself would have no great trouble in overcoming. So, as I understand it, you have no formal objection to legislation correcting the principal features as to which the dentists have complained?

Admiral MCINTIRE. If we can find a way to correct personal inequalities, I am the first person who would be glad to do it.

Mr. MOTT. I thought so.

Admiral MCINTIRE. Heaven knows, I have no feeling about any of it. These people are all friends of mine. I think any of the dental officers will tell you I have got in behind them and helped them over a lot of obstacles.

Mr. MOTT. You have listened here to a statement of their principal grievances, which they think would be corrected by this bill; and if the bill can be changed so as actually to correct these deficiencies—and you have admitted there are deficiencies in some respects—you have no objection to it?

Admiral MCINTIRE. If we can work it out so that we do not get ourselves snarled up; that we do either one of two things: Either set it up completely apart or make it so that we can still function to the best of our ability for the health and efficiency of the Navy.

Mr. MOTT. And still give the Dental Department this quasi autonomy with which they can best serve themselves and serve the Medical Department?

Admiral MCINTIRE. We naturally want the morale the best we possibly can get it.

Mr. MOTT. Do you have any suggestions as to the improvement of this bill? I do not know who wrote it, but I agree with Mr. Cole, as I read it, that it is a pretty poor sample of bill drafting.

Mr. RIVERS. Where?

Mr. MOTT. You did not draft it; did you?

Mr. RIVERS. I take credit for it, whether I did or not; I introduced it.

Mr. MOTT. You should have consulted the legislative draftsmen. We shall have to do this in executive session, but as I read this bill it is really not mandatory legislation. The first paragraph authorizes the establishment of—

> A Dental Department in the Navy, which shall function under the Surgeon General as is now provided in the case of the Medical Department.

Then, it goes on to language which would lead the casual reader to suppose that the rest of this was done by regulation, because there is no mandatory legislation in it. You would have to put in words to interpret what was meant. It authorizes or directs the setting up or establishment of a dental department. Then, to make any sense to it, you would have to say that it must so be established as "to provide that the functions of the Dental Department shall be," and so forth.

Paragraph (3) goes on to "provide that personnel of the Dental Department shall consist of," and so forth, "which shall have," and then put in words to interpret that.

The set-up, or whatever you call it, "shall be such as to provide" is not good language. We would have to rewrite the bill and make it mandatory if we are going to do this by legislation and not by regulation. I think it should be mandatory legislation. You have no objection to that approach; have you?

Admiral MCINTIRE. I would like to have something clear-cut to go on. I do not want to be put in a position of being told in one paragraph to do something, while in another paragraph there is a lot of ambiguity.

Mr. MOTT. Yes; but the objectives referred to in this bill are not objectionable to the Bureau of Medicine and Surgery or to the Surgeon General, and all that remains

to make it good is to make it reasonable legislation. I think you will have no difficulty in administering it just as you now administer the act creating the grade of admiral of the Dental Corps.

The CHAIRMAN. Thank you very much, Admiral.

STATEMENT OF VICE ADMIRAL RANDALL JACOBS, CHIEF OF NAVAL PERSONNEL, NAVY DEPARTMENT

The CHAIRMAN. Admiral Jacobs, have you any statement you desire to make to the committee in regard to H. R. 4216?

Admiral JACOBS. I have, Mr. Chairman. I have kept in close contact with the progress of the hearings on the bill now before the committee, and it is my desire at this time simply to augment the remarks of the Surgeon General of the Navy, if such is possible after his able presentation.

The primary mission of your Navy is to win this war. It is the duty of the commanding officer of every ship afloat to do his utmost to the fulfilment of this mission. The present organization is functioning most efficiently and I shall inform you of some of the details now in effect relating to the subject of this bill from the viewpoint of the commanding officer of a ship.

It is the duty of the commanding officer of a ship to preserve the health of the crew. The medical officer is in direct charge of the treatment and care of the sick and wounded, and advises the commanding officer in regard to matters affecting the physical fitness of the personnel. He reports to the commanding officer concerning the sanitary condition of the personnel and the prevention or checking of disease; he inspects the food, living spaces, and storerooms; keeps a health record of all officers and enlisted men in the command, and examines physically every man transferred. He is in charge of all medical stores and supplies and, as to personnel, is the officer in charge of the Surgeon's Division which consists of all medical and dental officers of the ship, pharmacists and enlisted men of the Hospital Corps.

The dental officer is assigned to the medical department of the ship under the general supervision of the medical officer. His services are restricted to those measures which will best preserve the teeth of the personnel and insure physical fitness. He shall keep the medical officer fully informed as to the conditions of his patients, and promptly notifies him of any cases requiring medical attention. Requisitions for dental property are made by the medical officer and in so doing he must be guided by the recommendations of the dental officer.

The setting up of a system, as this bill is designed to do, whereby the dental officer would execute the aforementioned inspections, reports, records and procurement of supplies relating only to the care of the teeth is a definite example of the duplication that the Army and Navy are striving to overcome.

The commanding officer makes frequent detailed inspections of his ship. It is his responsibility to take the necessary steps for the procurement of any needed supplies. The commanding officer knows his dental officer as he knows his medical officer and every other officer in the ship. The dental officer has access to the captain, as does every other officer in the ship. The commanding officer, and only the commanding officer, reports upon the efficiency of the dental officer and every other officer in the ship. He may receive recommendations on making out this report from any officer he chooses, and he usually requests recommendations from officers with whom the officer to be reported upon has worked in close contact. The commanding officer realizes that the making out of these fitness reports is one of his most important and exacting duties.

The dental officer is required to receive permission from the medical officer before he may leave the ship. The dental officer is an integral part of the health organization of the ship. Let us take the electrical officer who holds a degree in electrical engineering. He is an integral part of the engineering department of the ship under the supervision of the engineer officer who may hold a degree in mechanical engineering. The electrical officer is required to receive permission from the engineer officer before he may leave the ship. Responsible officers in any organization within a ship must know who is on board and who is ashore so that he may know whom to call upon in an emergency.

The Navy today is composed of personnel who have entered military service from all walks of life. A great many of these people have never before been subjected to military discipline, and we cannot expect them to become thoroughly accustomed to the life in a short time. We must be patient with them. We have medical officers, dental officers and other professional individuals in the Navy today who are doing a magnificent job toward the winning of this war. Any reorganization affecting the functioning of these efficient officers and enlisted men must be most carefully considered before it is placed in effect.

The Surgeon General has pointed out the serious situation regarding the enlisted personnel. This bill would remove a certain group from the battle organization and restrict their contribution to the field of dentistry. At the present time, they are pharmacists' mates and Hospital Corps men, qualified in all aspects of the health organization, and, with their transfer to a unit in which they will operate only as dental technicians, we shall need more pharmacists' mates and Hospital Corps men as replacements.

The Medical Department of the Bureau of Medicine and Surgery was set up by regulation and not by law. Enactment of this bill in its present form would result, for the first time, in Congress going into the organization

of a single bureau and establishing subordinate functions.

The Navy is justly proud of its dental officers and this conclusion is the result of their standard of efficiency. Maintenance of this efficiency will help the morale of all naval personnel.

I strongly recommend against enactment of H. R. 4216.

There is another point I should like to bring up, in connection with what Mr. Maas was talking about—namely, commands. Aboard ship or at any naval station, there is only one person in command, and that is the commanding officer or commandant. The only places where staff officers command are naval hospitals, where medical officers are in command, and supply depots, where supply officers are in command. I would like to have the record straight: That some of the remarks made by Mr. Maas about commands aboard ship actually do not exist.

Mr. MAAS. Admiral, I said, if you listened carefully, when pressing the point as to the actual word "command," that, of course, there is only one commanding officer aboard ship. But the commanding officer cannot do everything. I meant that any division head runs his own division.

Admiral JACOBS. But he has no authority over discipline or anything else. That must be in the record.

Mr. MAAS. Technically you are correct; but the question whether a man is to be recommended to go before the mast or recommended for other types of punishment or recommended to be given shore leave is initiated with the division commander.

Admiral JACOBS. Not regarding punishment. Anyone can report anyone else aboard ship for punishment. The division officer does not have to do it.

Mr. MAAS. But it is done, as a matter of practice, through the division officer.

Admiral JACOBS. No, sir; it is done through the executive officer.

Mr. MAAS. But contact between the affected personnel and the executive officer is the division officer.

Admiral JACOBS. Yes; but the medical officer may report a man in the first turret division for some infraction of the regulations.

Mr. MAAS. Just as any civilian may report any other civilian to the judicial authorities. But you know that the actual organization of a ship is such that you have to divide the administrative duties and the responsibility for them; you cannot personally oversee every man on the ship.

Admiral JACOBS. That is true.

Mr. MAAS. It is done by divisions.

Admiral JACOBS. The organization is by divisions, but I want it clearly in the record that responsibility for discipline rests with the commanding officer, and the only one who can execute punishment aboard ship or in a command is the commanding officer.

Mr. MAAS. I do not disagree with that, and I do not intend to imply anything different. But the medical officer runs the Medical Department.

Admiral JACOBS. He administers it.

Mr. MAAS. He administers it. If there is a difference between administering it and running it, I will accept it; but a dentist does not administer the Dental Department for the dental personnel.

The CHAIRMAN. Thank you very much, Admiral.

STATEMENT OF REAR ADMIRAL THOMAS L. GATCH, JUDGE ADVOCATE GENERAL, NAVY DEPARTMENT; FORMER CAPTAIN OF THE BATTLESHIP "SOUTH DAKOTA"

The CHAIRMAN. Admiral Gatch, the committee would like to have you, as the former captain of the battleship *South Dakota,* testify in that capacity as to the effect this bill would have upon the organization aboard ship.

Admiral GATCH. Mr. Chairman, I think I had better start off by telling how a battleship is organized. First of all, a battleship is organized for battle. That permeates the whole structure, economy and running of the ship. If the dentists are to be removed from any important function in battle, then the dentists should be removed from a combatant ship, because there is no room for them.

I am not an old fogey, but I left the Naval Academy and went aboard ship when there were no dentists aboard ship. So I still look upon them rather in the nature of a luxury, because in those days when a ship came into port we got our teeth overhauled along with the overhaul of the ship. If the dentists are not functioning in battle, then the dentists should not be aboard a combatant ship.

Mr. RIVERS. As the Judge Advocate General, it is your function to help us write a bill. That is why we have you here.

Admiral GATCH. I should be glad to testify.

Mr. RIVERS. You are testifying against this bill, but you are not testifying as assistant to this committee.

Admiral GATCH. I would have to be in a position to construe this bill. The chairman said that I am now testifying as a former captain of a battleship.

Aboard the *South Dakota,* we had three medical officers, three doctors of medicine. The senior one was a commander, the second was a lieutenant commander and the third was a lieutenant, junior grade. We had two dental officers of the rank of lieutenant. It might be that the lieutenant, junior grade, would be the senior doctor of medicine aboard, in which case the two dental officers who were senior to him would have to report to him to get permission to leave. As a commanding officer of the ship, it was never a matter of concern to me whether or not there was a dentist aboard; but, of course, it was a matter of vital concern that there

be a doctor of medicine aboard at all times, because in a ship you are literally sitting on a powder keg; you do not know when something is going to happen and you are going to need a doctor very badly; but if a man has a toothache, a doctor of medicine can give him some paregoric to carry him over until the next morning. Whether or not a dentist is aboard never worries the captain of a ship, especially in time of battle. I unfortunately had some experience with the workings of the medical department. The man who fed me ether was one of the dental officers. The second officer aboard that ship, a lieutenant commander, who did the surgery, because that was his specialty, operated for thirty straight hours, and they fed him toast and doughnuts to keep him going. The dental officers took turns feeding ether as the surgeon got ready for them. So the dental officers played their vital role. They are important aboard ship if they function as a part of the medical department in the set-up. But I cannot see any doctor filling a hole in a tooth in time of battle. If that is what they are going to be limited to, then there is no place for them aboard a fighting ship, and they should be kept on auxiliaries, and when the ship comes into port, the dental work of the men can be done.

I think the present set-up is very good. Of course, it has always been a source of mild humor among the poor, common variety of line officers how important rank becomes among the staff officers. I was captain of the ship, and when I left the ship I got permission from nobody, because there was nobody to give me permission; but every time I left the ship, I went out and saluted the officer of the deck, who might be an ensign, and told him I was leaving the ship. It never hurt my feelings to salute an ensign and tell him I was leaving the ship. I do not think it ever hurts anybody's feelings. That is about all I have to say as captain of a battleship.

Mr. COLE. Mr. Chairman, I think it is appropriate to say that this is the first time Admiral Gatch has appeared before the committee as a witness, and I think he made a very fine presentation.

Mr. RIVERS. As captain of a ship.

The CHAIRMAN. That was what he was testifying as.

Mr. RIVERS. I understand that his testimony was as captain of the *South Dakota;* that is all I want to know.

STATEMENT OF REAR ADMIRAL A. G. LYLE, DENTAL CORPS, UNITED STATES NAVY, MATÉRIEL DIVISION, BROOKLYN, N. Y.

The CHAIRMAN. Admiral Lyle, as senior officer of the Dental Corps of the Bureau of Medicine and Surgery, any statement you desire to make will be appreciated by the committee.

Admiral LYLE. Thank you, sir. I have no statement to make. For the record my name is A. G. Lyle; rank, rear admiral, Dental Corps, United States Navy; attached to Matériel Division, Brooklyn, N. Y. I am here before you, ladies and gentlemen, at the request of the Surgeon General, to answer any questions you wish to put before me.

The CHAIRMAN. Give us the benefit of your views, Admiral, with reference to this proposed bill. Just talk freely, frankly and candidly. Just acquaint us with what you think.

Admiral LYLE. Sir, with no legal mind except the ordinary mind of a man, I am in favor of this bill, because I thought it would improve the efficiency of the Dental Corps or the dental service of the Navy. But apparently, from listening to the conversation, I have interpreted the bill one way, and it has been interpreted in other ways by other gentlemen.

The Surgeon General is a personal friend of mine, and I do not care to embarrass him with any statements I may make. He has striven as much as he possibly can under present regulations to give the Dental Corps and the dental service all that he possibly could give them, but the Surgeon General's hands have been more or less tied in many ways by the existing regulations.

As I interpret this bill, sir, it could be straightened out so as to give him, as Chief of the Bureau of Medicine and Surgery, an opportunity to do far more than he has already done for dentists.

The CHAIRMAN. What do you think should be done, either by statute or by regulation? What is the complaint?

Admiral LYLE. The main complaint, as I see it, sir, in the field—and I have talked to many dental officers in the field on this in sufficient numbers to believe that almost all the dental officers are in favor of this bill—is that there is a personnel side to it. They do not like—and they have a right to feel that way, in my estimation—when they have prepared an issue rating of the supplies that they use, they do not like to have requisitions made out by medical officers and representatives of medical officers in the field who may cut down those supplies at any time they see fit. A lot of that fault is two ways: It is the fault of the dental officer and the fault of the medical officer. Looking at it that way, you have personalities coming into the picture.

The CHAIRMAN. In that connection, the commandant of the station passes upon it finally, and he may cut it down.

Admiral LYLE. Ah, sir, but you must take into consideration that the commandant of the station nine times out of ten takes the word of the senior of a department. The man in charge of a department is responsible for that department and the running of it.

The CHAIRMAN. Then, one of the complaints in the field is with reference to material and supplies. A dental officer does not

desire any one to have any control over it or pass upon it except a dental officer?

Admiral LYLE. That is one of the complaints, sir.

The CHAIRMAN. If you follow that on down, the same complaint could be lodged against the Bureau of the Budget or against the Surgeon General—that is, if it were carried out to its final analysis. So one of the complaints of the people in the field is that the dental officer's requisitions for supplies have to be approved by a medical officer; is that correct?

Admiral LYLE. Approved, corrected and adjusted, sir.

The CHAIRMAN. That is correct; approved, corrected and adjusted. For that reason, he does not want to have that limitation placed upon him?

Admiral LYLE. Correct, sir.

The CHAIRMAN. What is the other complaint in the field?

Admiral LYLE. That is really a secondary complaint in the field in one consideration. The other complaint in the field, that I have become cognizant of in the past and am cognizant of now, is that dental officers have had to ask permission to do this and that from medical officers, the dental officers having the idea in mind, and I believe correctly so in many instances, that the medical officers do not have a true understanding of dental conditions because they are not dental practitioners and have not a complete knowledge of dentistry.

The CHAIRMAN. Does that relate to professional matters or to nonprofessional matters?

Admiral LYLE. Now, Mr. Chairman, we are getting into personalities again, I am afraid. It leads naturally to both, sir.

The CHAIRMAN. Do you mean to say that medical officers try to tell dental officers from a professional standpoint how to handle their professional duties?

Admiral LYLE. Not how to practice dentistry, sir; no, but they do have the authority as the officer in command of that department, in command of the administration of that department—everything to do within that department—and naturally they have authority over everything within that department, do they not, sir?

The CHAIRMAN. Therefore, they resent that?

Admiral LYLE. Naturally; in some cases, they do.

The CHAIRMAN. What is the other complaint?

Admiral LYLE. I have given you the two main complaints, sir.

The CHAIRMAN. What effect will that have upon the professional service that the dentists render?

Admiral LYLE. I believe, sir, from the moral effect upon dentists in the field and dentists not in the field, that once they are allowed—and this is my interpretation, sir; my idea—the privilege of handling dental matters themselves and being responsible for dental matters, it will straighten out the entire situation.

The CHAIRMAN. Then, it could be accomplished by regulations?

Admiral LYLE. Now, I am not quite clear on that, sir. As I said——

The CHAIRMAN. Is there any law to prohibit regulations to deal with the questions you have just mentioned?

Admiral LYLE. If I am clear, sir, I will answer that question in this way: I believe there was a statute passed in June 1912 which created the Dental Corps separate and distinct from the Medical Corps, but as a part of the medical department. That is as close as I can remember the initial bill. Since the bill became the original statute, further bills have improved the rank and have given equality to the Dental Corps in ranks of promotion, which the Dental Corps has no complaint about.

The CHAIRMAN. Then, why could not either of the objections you have pointed out be remedied by regulations in the Department?

Admiral LYLE. I believe, sir, that once the statute was passed—and you can correct me if I am wrong, because I am not legal-minded—it became a part of the medical department.

The CHAIRMAN. It is a part of the medical department. Have you any objection to being a part of the medical department?

Admiral LYLE. I have no objection to serving under the Surgeon General of the United States Navy, sir.

The CHAIRMAN. Then, you are a part of the medical department?

Admiral LYLE. I would love to have the privilege before my career is finished to see a dental department in the United States Navy, sir, under the Surgeon General.

The CHAIRMAN. As suggested by the Surgeon General, why do we not deal with the question directly? Why do we not create a department separate and distinct from the Bureau of Medicine and Surgery and call it the dental department or dental bureau?

Admiral LYLE. I am not in favor of that, sir.

The CHAIRMAN. Then, what is the objection?

Admiral LYLE. My objection to that is that in time of war, sir, that would create too great a change, and I consider it a pleasure to want to serve under the Surgeon General of the United States Navy.

The CHAIRMAN. Then, the main things in the field of complaint, as you have just stated, are those two things?

Admiral LYLE. Those are the two.

The CHAIRMAN. One with reference to material, and the other with reference to personnel making requests?

Admiral LYLE. There is a third complaint, which has been talked over here at this

hearing. That is the jurisdiction over the immediate personnel which works under the dental officer—dental technicians, in other words. This condition has existed, and the Surgeon General has taken all means at present to stop this condition. Hospital Corps men of the Navy with the technical education of dental technicians, prosthetic, work under the dental surgeon during the daytime but are not subject to his control after that time. Those corps men may be called upon at any time for medical duties. Now, in time of emergency, sir, that is necessary; but in time of emergency, when a man stands on his feet all day for seven hours and does the work that is demanded of him by the dental officer, that man is tired.

The CHAIRMAN. Then, to put it in plain language, the main complaint is that the dentists do not want to take orders from a doctor?

Admiral LYLE. I am afraid you have misrepresented by statement a little, sir. I do not think that any dental officer in time of emergency would hesitate one moment in taking orders from anybody who knew his subject; and in time of battle, when I have had the honor to be present, I feel that any dental officer—that is, if he is a dental officer, an officer of the United States Navy—takes his orders from the man who can give them and who knows what he is doing.

The CHAIRMAN. Do you feel that there is any discrimination against dentists in the Navy?

Mr. RIVERS. Answer that question, please?

Admiral LYLE. I believe that in the past there has been. It has been the endeavor of the Surgeon General to alleviate that discrimination as much as he possibly can under present existing conditions.

The CHAIRMAN. I cannot understand how the statute prohibits him, if there is any discrimination. All the statute did merely was to create a dental corps. It does not prohibit him from issuing any rules and regulations, under that statute, to eliminate discrimination.

Admiral LYLE. The Surgeon General, who is Chief of the Bureau of Medicine and Surgery, is in Washington, D. C., and could not know everything that happens in the field. A junior dental officer would not have the necessary fortitude to go over his senior medical officer and report to him that he had been or had not been discriminated against. I feel that this bill, as I interpret it, would alleviate that condition.

The CHAIRMAN. Are there any questions?

Mr. RIVERS. Did you hear the testimony of Admiral Jacobs?

Admiral LYLE. Yes; I did, sir.

Mr. RIVERS. Do you agree with that testimony?

Admiral LYLE. Admiral Jacobs is my superior officer.

Mr. RIVERS. I shall not ask that question.

How many admirals do you have in the Bureau of Medicine and Surgery?

Admiral LYLE. I think there are thirteen, if I am correct, in my memory, on the active list.

Mr. Rivers. What is the personnel of the Department of Medicine and Surgery?

Admiral LYLE. The entire personnel? I cannot answer.

Mr. RIVERS. Seventeen thousand?

Admiral LYLE. That is an approximation, sir.

Mr. RIVERS. How many dentists are there?

Admiral LYLE. We have approximately 5,400, sir.

Mr. RIVERS. A ratio of about 3 to 1 in rough figures. How many admirals do you have?

Admiral LYLE. One on the active list and one on the retired list, sir.

Mr. RIVERS. Do you think that that might have some bearing on the question of the attitude of the whole Bureau of Medicine and Surgery? To make my question clear: All the admirals in the Medical Department and none in the Dental Corps?

Admiral LYLE. Mr. Rivers, one has to have a place to put senior officers, officers of senior rank. I have talked that over with the Surgeon General, and he has told me that he has other views in mind for advancement in the Dental Corps.

Mr. RIVERS. If we removed these 6,000 dental personnel from the medical set-up, would the doctors lose a few of their admirals?

Admiral LYLE. That I do not know, sir.

Mr. RIVERS. Were you in the last war?

Admiral LYLE. I was, sir.

Mr. RIVERS. In what department?

Admiral LYLE. I was attached to the Fifth Regiment, United States Marines, American Expeditionary Force, in France, sir.

Mr. RIVERS. You were not by any chance decorated, were you?

Admiral LYLE. I was fortunate, sir.

Mr. MAAS. It is your feeling as an admiral that the dental officer of a station should have direct access to the commanding officer of the station on matters of his requisitions?

Admiral LYLE. It is, sir.

Mr. MAAS. As it is now, he has to make his case to the senior medical officer, and then the senior medical officer presents it to the commanding officer of the station, on requisitions; is that correct?

Admiral LYLE. At most naval stations, sir, at the commanding officer's conference, dental officers are not present, sir.

Mr. MAAS. You feel that a great deal could be corrected on the matériel side of the objections if the senior dental officer had direct access to the commanding officer and did not have to channel his requisitions for supplies, and so on, through the senior medical officer; is that correct?

Admiral LYLE. I feel that if the senior dental officer had knowledge of everything that happens on the station, he could plan efficiently for the dental service on that station.

Mr. MOTT. How long have you been in the Navy, Admiral?

Admiral LYLE. Twenty-eight and one-half years, sir.

Mr. MOTT. You are in the Regular Navy?

Admiral LYLE. I am, sir.

The CHAIRMAN. Thank you very much.

STATEMENT OF CAPT. ROBERT S. DAVIS, CHIEF, DIVISION OF DENTISTRY, BUREAU OF MEDICINE AND SURGERY

The CHAIRMAN. Now, members of the committee, we shall hear from Captain Davis. Captain Davis, we shall be glad to have you give the committee the benefit of your views about this bill.

Captain DAVIS. Mr. Chairman: My name is Robert S. Davis, captain, Dental Corps, United States Navy; Chief of the Division of Dentistry, Bureau of Medicine and Surgery.

The CHAIRMAN. All right, Captain; go right ahead.

Captain DAVIS. I have no statement to make in addition to what Admiral Lyle has said. I concur in everything he has said. I think he has brought up the difficulties that we encounter. The main thing that the Dental Corps wants—and I believe it is 100 per cent in that respect—is complete control of the dental activity in all respects. That means control of its matériel and its personnel.

The CHAIRMAN. Control of matériel and personnel?

Captain DAVIS. Of its personnel and its functions.

The CHAIRMAN. Does that mean that you would have control of the selection of officers of the Dental Corps, the training of the personnel and the running of it separately and independently?

Captain DAVIS. I think that is what the officers of the Dental Corps desire.

The CHAIRMAN. Then, why do you want to be functioning under the Surgeon General? Why not be completely separated and divorced from the Surgeon General?

Captain DAVIS. I think that most of us agree that it would be more efficient to have this under the Surgeon General.

The CHAIRMAN. How is it going to be? The Surgeon General is charged with certain responsibilities in the matter of the health of the Navy. If you are going to have complete control of the personnel and the matériel, then you would be imposing, would you not, on the Surgeon General, probably, things that the Surgeon General himself would not want or would not approve of, and therefore he would be bound by it, unless he had a complete veto over it; and if he had a veto over it, then you would not be in full control.

Captain DAVIS. I think the feeling is, Mr. Chairman, that in the functioning of the Bureau of Medicine and Surgery, the functions should be entirely under the Surgeon General, and the Bureau should function as he directs. The difficulties with the dental officers come after the Bureau of Medicine and Surgery. The difficulties, complaints and things which I have to listen to in my office come mostly from the field, and they have to do with things that are taking place in the field. I think that the way everything is handled in the Bureau of Medicine and Surgery—what corrections are necessary or indicated, or the desire of the Surgeon General—he could do administratively, and it would not require legislation. Therefore, I do not think that legislation particularly affects the Bureau of Medicine and Surgery.

The CHAIRMAN. If you say that all that the dentists want is to have complete control of everything relating to dentistry, such as matériel and personnel, then what objection would there be to establishing a complete separate bureau, where you can run your own organization, because you have no relation, under your statement, to the health phase. You will be confined strictly to the dental profession. Then, why should not they be put up as a separate and distinct organization?

Captain DAVIS. That would probably be very well to do, but it would be a great deal more difficult to do.

The CHAIRMAN. That is what the dentists would like to see done, is it not?

Captain DAVIS. I believe there are some who would like to see that done; yes, sir.

The CHAIRMAN. If you are sound in your position and your logic with reference to having complete control, why not have complete control all the way from the top to the bottom?

Captain DAVIS. There is a relationship between medicine and dentistry, and there must be a cooperation between the two professions. It seems to me that a tie-in, by having the Surgeon General as the head of both departments, would be advisable.

The CHAIRMAN. You are a little apprehensive that now is the psychological time to advocate a complete bureau?

Captain DAVIS. Yes, sir.

The CHAIRMAN. All right.

Mr. MOTT. Would you amplify your last answer?

Captain DAVIS. Mr. Chairman, will you please repeat your last question?

The CHAIRMAN. Your statement leads me to believe, if you are sound in it, that there would be no justification in keeping you under the Bureau of Medicine and Surgery and that ultimately you will be advocating complete divorcement from the Bureau of Medicine and Surgery.

Captain DAVIS. If I answered that by saying "yes, sir," I did not intend to.

Mr. MOTT. For your information, that was not the question the chairman asked.

I should like you to ask the same question you asked before, Mr. Chairman.

The CHAIRMAN. Your next step will be to ask for complete divorcement, if you are sound in asking that you have complete control of it now.

Mr. MOTT. Don't worry, Captain; he is not going to ask that question again.

The CHAIRMAN. Is not that correct?

Captain DAVIS. I do not think so.

The CHAIRMAN. Are there any other questions?

Mr. MOTT. How long have you been in the Navy?

Captain DAVIS. Twenty-seven years next month.

Mr. MOTT. You are in the Regular Navy?

Captain DAVIS. Yes, sir.

Mr. MOTT. I just want to ask you, Captain, if you know any dental officer in the Navy who is not in favor of the principle set forth in this bill, even though from the viewpoint of the legislative draft it may require improvement? Do you know of any dental officer in the Navy who is not in favor of it?

Captain DAVIS. I know of none, sir.

The CHAIRMAN. Do you know of any officer who is in any corps who does not always want to have complete control over that corps?

Captain DAVIS. I have not discussed that with every officer.

The CHAIRMAN. But that would naturally follow with any group of men classified as a corps. They want that corps to be separate and independent and to have complete control of the matériel and personnel of that corps, with no one else having anything to do with it. Was not that true with reference to the engineers? Was not that true with reference to all the staff corps?

Captain DAVIS. I should think that would be very likely, sir.

Mr. MAAS. In that connection, that even hit the Bureau of Medicine and Surgery one time that I can remember, when there was a move by line officers to take command of hospitals, because they were very fine commands. They were the equivalent of battleship commands. The doctors fought very hotly at one time to control their own bureau. So I do not think that that is any precedent.

Mr. RIVERS. About the training of dentists: Dentists are trained identically, in point of time, the same as doctors? They receive premedical training and four years of dentistry?

Captain DAVIS. The premedical education is identical, and the dental and medical education requires the same length of time. The subjects are not, naturally, the same throughout the entire course.

Mr. RIVERS. They each get separate degrees?

Captain DAVIS. They get separate degrees; yes, sir.

Mr. RIVERS. They belong to separate organizations?

Captain DAVIS. Yes, sir.

Mr. RIVERS. In civilian life, they are separate?

Captain DAVIS. They are separate, and they have their own separate societies and separate professions.

Mr. RIVERS. In the Navy of the United States, they are subservient to the medical profession?

Captain DAVIS. They are part of the medical department.

Mr. RIVERS. Mr. Mott in his question asked you if everybody in the Navy favored the objective of this bill, even though, bad as it is written, as Mr. Mott says, many features will have to be corrected. All the dentists in the Navy favor the objective of this legislation?

Captain DAVIS. He asked me if I had heard of any who were not in favor of it, and I said I had not.

Mr. RIVERS. Therefore, it follows that they are all pretty well in favor of this legislation?

Captain DAVIS. Yes, sir; they are.

Mr. RIVERS. There are 70,000 dentists in civilian life. Do they not favor the objectives of the legislation, with the exception of that group with whom you are not in accord, who want to completely divorce the dental corps from the Surgeon General?

Captain DAVIS. There is such a group. I cannot say what the 70,000 dentists think, because I have talked with very few civilian dentists concerning this bill.

Mr. RIVERS. You have heard it said that they agree?

Captain DAVIS. Yes, sir.

Mr. RIVERS. It is generally conceded that they do, with that one exception?

Captain DAVIS. Yes, sir.

Mr. RIVERS. But as far as you are concerned, you prefer to stay under the Surgeon General?

Captain DAVIS. I believe it would be to the best interest of the Navy.

The CHAIRMAN. You say that the training of dentists and medical officers up to a certain point is the same?

Captain DAVIS. Predental training and premedical training are identical.

The CHAIRMAN. Then, when you circumscribe your activities strictly to dentistry, you are not utilizing the full benefit of your training by getting out of the Bureau of Medicine and Surgery, which deals with the whole question of health?

Captain DAVIS. I do not believe I understand your question.

The CHAIRMAN. You are trained along the same lines? You have the same fundamental training as a doctor?

Captain DAVIS. That is true for preprofessional training, Mr. Chairman. I do not mean to say that the training throughout the entire course in dentistry and in medicine is identical.

Mr. VINCENT. Captain, in private life, the doctors have always felt that dentists were not as well trained and educated and had not as high standing as the doctors had; has not that been your observation in private prac-

tice? The doctors have said that dentists only looked in a fellow's mouth, while the doctors have to look all over. So the doctors have always looked down upon dentists as being hardly their equals.

Captain DAVIS. We have felt that that was sometimes so.

Mr. VINCENT. Has not that feeling existed among the public, so far as doctors are concerned, as a rule; not by every one?

Captain DAVIS. I do not know how the doctors feel, sir, but sometimes we feel that they perhaps do not consider us their equals.

Mr. VINCENT. Somewhat along the lines of Admiral Gatch's testimony, the dentists are considered as luxuries. When a man gets a toothache, the doctor gives him paregoric to rock him to sleep, or gives him a little rock and rye and takes him into the station to be treated. In the Navy you are still looked down upon to some extent by the medical profession as not being in their class. Does not that feeling permeate the dental officers?

Captain DAVIS. Yes, sir; some of them feel that that situation exists.

Mr. VINCENT. If you were an anemic or had lost your appetite, the doctor would say, "Get your teeth out." Several members of this committee have already lost their teeth upon the advice of doctors. So you are still more or less a stepchild. You have to ask somebody else in order to get leave and in order to buy supplies?

Captain DAVIS. I think the officers feel that they are pretty much in that position.

Mr. VINCENT. You want to be brought in to eat at the head of the table with the other fellows; is that right?

Captain DAVIS. We would like to be considered in the same light as the medical officers; yes, sir.

Mr. VINCENT. Cannot a dental officer write a letter to the Secretary of the Navy and complain about the situation?

Captain DAVIS. If he chose to do that, it would be advisable for him to send it officially and through official channels. I question whether he would want to do it at all.

Mr. VINCENT. I had some experience with a case of that kind. A lieutenant commander in the Navy, who was on an aircraft carrier, who was a doctor in Chicago and knew personally Secretary Knox, and who had volunteered for active front duty, when the carrier was disabled and came into port he wrote the Secretary a letter because he knew him personally. He said, "The captain of the ship, the officers, and the doctors are sick with flu and pneumonia, and the place where they are temporarily quartered is mighty bad. You ought to investigate." Would you have an idea what happened to the lieutenant commander, who was in the Medical Corps?

Captain DAVIS. Yes, sir; I would have an idea.

Mr. VINCENT. Well, he got a letter back. It was not from Secretary Knox. He was immediately transferred to Bethesda, out here. He was taken off duty. He happened to know the doctor out there, and he was assigned to a certain ward. The fellow said, "Because of my acquaintance with you, I am keeping you here; but you are supposed to be confined. I have orders to hold you as a mental case." The man came from my district originally; that is why he came to me. I went to bat for him. That is what happens to the fellow down the line who undertakes to go to the top. He was about to be turned out to the public as a mental case; but, of course, he was not; because he had sense enough to appeal for relief. So a dental officer dare not write a letter to the Secretary of the Navy or even to the Surgeon General without taking the matter up through channels, which would mean through the medical officer; is not that true?

Captain DAVIS. That is correct, sir.

Mr. VINCENT. If he is smart, he just will not do as my friend did.

Captain DAVIS. He will not, sir.

Mr. MAAS. I am impressed with the fact that every naval officer who is a dental officer who came before us expressed, apparently freely and openly, a position in opposition to the Surgeon General. Evidently you did not bear down on these people, Admiral McIntire.

Captain DAVIS. The Surgeon General is well acquainted with my feelings in this matter, because we have talked about it, and he asked me to make some comment on the bill soon after the bill was introduced. In that comment I expressed the same thoughts I have expressed today.

Mr. RIVERS. Do you have with you a copy of that comment on the objective of this bill?

Captain DAVIS. Yes, sir; I have.

Mr. RIVERS. Did you comment on this bill officially for the Surgeon General?

Captain DAVIS. I was requested when the bill was introduced to present comment on the bill to the chief clerk in the Surgeon General's office, and I did make that comment.

Mr. RIVERS. Do you have it here at the present time?

Admiral MCINTIRE. No; I do not have it.

The CHAIRMAN. Do you want to put your comment in the record?

Mr. MOTT. What is the use of doing that? Every witness who has appeared here from the Dental Corps has expressed exactly the same views. They concur in it. The purpose of my short examination of the Surgeon General was to find out whether he did not also concur, and I believe that in principle he does concur.

There is one more question. I did not ask this of anyone else, because I thought it was a little farfetched. You do not want, and in this bill it is not your purpose to ask for, command in a battle organization, do you?

Captain DAVIS. No, sir.

Mr. HÉBERT. Captain, exactly what is your administrative capacity in the Dental Corps? Are you the top administrative officer?

Captain DAVIS. I am the Chief of the Dental Division, and the Dental Division is defined as having cognizance of the professional standards and inspections.

Mr. HÉBERT. In other words, are we to understand that your position is really the head of the Dental Corps for administrative purposes?

Captain DAVIS. No, sir.

Mr. HÉBERT. Of course, the Admiral is above you. Is there any other officer?

Captain DAVIS. There is no one who has any such title as head of the Dental Corps.

Mr. HÉBERT. Are you the nearest to what would be accepted as the head?

Captain DAVIS. I am chief of a division of the Bureau of Medicine and Surgery.

Mr. HÉBERT. Yet you have above you no one that you know of in the Dental Corps?

Captain DAVIS. There are several officers senior to me in rank, including, of course, Admiral Lyle.

Mr. HÉBERT. Naturally.

Captain DAVIS. But I happen to occupy the position of Chief of the Division, which is not necessarily held by the senior officer in the corps.

Mr. HÉBERT. But for all administrative purposes you are the head officer?

Captain DAVIS. You might say so.

Mr. HÉBERT. Then, when this bill was introduced, it was referred to you for your comment?

Captain DAVIS. Yes, sir.

Mr. HÉBERT. You reported upon it favorably?

Captain DAVIS. I reported in favor of the bill.

Mr. HÉBERT. In favor of the bill; but when the report came to this committee, signed by Secretary Knox, it was an unfavorable report. Therefore, your opinion was superseded or overruled by men in Medicine.

The CHAIRMAN. Or Personnel?

Mr. HÉBERT. Or Personnel?

The CHAIRMAN. Or the Judge Advocate General or the whole naval organization. That happens all the time. Officers in charge of a certain section might act favorably upon something, but the viewpoint of the Navy is entirely different from their viewpoint.

Mr. RIVERS. I want Admiral McIntire to know that we appreciate his fairness in presenting all the witnesses. He has even made a great effort to get behind this bill, even though he might offend some of the medical officers.

The CHAIRMAN. This finishes the testimony; tomorrow we shall take up the bill for consideration of amendments and substitutes. Admiral McIntire, will you be back here tomorrow morning?

Admiral MCINTIRE. At what time, sir?

The CHAIRMAN. We will make it 10 o'clock.

(At 12:15 p.m. a recess was taken until Tuesday, June 6, 1944, at 10 a.m.)

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NAVAL AFFAIRS,
Tuesday, June 6, 1944.

The committee met at 10 a.m., Hon. Carl Vinson (chairman) presiding.

The CHAIRMAN. The committee will come to order. We shall begin the reading of the bill H. R. 4216.

Mr. COLE. Mr. Chairman, may I suggest that we waive the reading of the bill, because everybody is pretty much familiar with it? We have a roll call at 11 o'clock, and the omission of the reading of the bill would save time.

The CHAIRMAN. Without objection, let the bill be printed in the record instead.

(The bill, H. R. 4216, is as follows:)

[H. R. 4216, 78th Cong., 2d sess.]

A BILL To provide more efficient dental care for the personnel of the United States Navy

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (1) the Secretary of the Navy be authorized and directed, no later than sixty days after this act becomes law, to establish a Dental Department in the Navy, which shall function under the Surgeon General as is now provided in the case of the Medical Department.

(2) To provide that the functions of the Dental Department shall be of such professional, technical, and administrative nature as pertain to the conduct of the naval dental service, including cooperation with the Medical Department in all matters of mutual interest and cognizance.

(3) To provide that personnel of the Dental Department shall consist of (a) officers of the Dental Corps, one of whom shall serve as Director of Dentistry and be directly responsible to the Surgeon General for the administration of dental affairs within the Bureau of Medicine and Surgery: (b) chief warrant and warrant officers in numbers not exceeding 5 per centum of the total number of officers of the Dental Corps: (c) enlisted personnel in such ratings and distribution by pay grades within the ratings and in such numbers not to exceed 166 per centum of the total number of dental officers, as may be prescribed by the Secretary of the Navy: *Provided further*, That nothing stated herein shall act to reduce the grade or rank of any person.

(4) To provide that the Director of Dentistry shall be appointed by the President from dental officers on active duty and that the Director of Dentistry shall, while so serving, have the rank of Rear Admiral.

(5) This Act to take effect immediately upon its approval by the President.

The CHAIRMAN. The bill is now ready for discussion and for amendment.

Mr. RIVERS. I have an amendment I should like to offer.

The CHAIRMAN. The amendment proposed by Mr. Rivers is as follows:

The Secretary of the Navy shall within sixty days after the date of enactment of this Act reorganize the Bureau of Medicine and Surgery in accordance with the provisions hereof.

SEC. 2. The functions of the Medical Corps and those of the Dental Corps shall each be defined and prescribed by regulations of the Secretary of the Navy, and each such corps shall have a Director, who shall be responsible to the Chief of the Bureau of Medicine and Surgery.

SEC. 3. An officer of the Medical Corps of the Navy shall be detailed as the Director of the Medical Corps, and an officer of the Dental Corps of the Navy shall be detailed as the Director of the Dental Corps. Such officers, while so serving, shall have the rank, pay, and allowances of a rear admiral. No

provision of this Act shall be construed to reduce the rank or pay of any person.

SEC. 4. The Secretary of the Navy shall provide by regulations for establishing on ships and on shore stations dental services to be administered under the senior dental officer who shall be responsible directly to the commanding officer of such ship or shore station for all professional, technical, and administrative matters in connection therewith.

SEC. 5. The Secretary of the Navy shall provide by regulations for a suitable number of dental technicians of appropriate ratings and ranks and for their training, detail, retention, supervision, and direction by appropriate dental officers in carrying out the provisions of this Act.

SEC. 6. In carrying out the provisions hereof, the Secretary of the Navy shall consult with the Chief of Naval Operations and shall not impose any administrative requirements hereunder on combatant ships or in combatant areas ashore which would interfere with the proper functioning of battle organizations.

SEC. 7. All laws and parts of laws in conflict herewith are hereby repealed.

Now, Admiral Gatch, will you, as the legal adviser to the Secretary of the Navy and as legal adviser to the committee, explain exactly what this proposed amendment does?

Admiral GATCH. In section 6, sir?

The CHAIRMAN. No; the whole thing.

Admiral GATCH. It is quite clear in its terms, Mr. Chairman. It sets up a dental corps along with the medical corps.

The CHAIRMAN. It sets up also a medical corps with a responsible head?

Admiral GATCH. Yes; so the Dental Corps and the Medical Corps will be under the Chief of the Bureau of Medicine and Surgery, on an equal footing with each other.

The CHAIRMAN. It will accomplish equality between the two health services, the doctors and the dentists?

Admiral GATCH. Yes, sir.

The CHAIRMAN. Then, what is the next thing it accomplishes?

Admiral GATCH. That is about the gist of it.

The CHAIRMAN. It then permits rules and regulations to be promulgated by the Secretary of the Navy?

Admiral GATCH. That is so that it will not interfere with combat duty.

The CHAIRMAN. It also permits the rules and regulations to be of such character aboard ship that it will always be borne in mind that the mission of the ship is as a fighting unit?

Admiral GATCH. Yes, sir.

The CHAIRMAN. It permits somewhat different rules and regulations regarding shore stations?

Admiral GATCH. Yes, sir.

The CHAIRMAN. Admiral McIntire, have you had an opportunity to discuss this or to study the proposed amendment?

Admiral MCINTIRE. I have looked it over. I had about 15 minutes this morning in which to look it over. It is pretty broad. It covers all the territory that there is.

The CHAIRMAN. Do you feel that you should have a little more time to consider this matter? And will the Judge Advocate General need more time?

Admiral MCINTIRE. I should think so. I do not see how you can draft a bill, put it in shape, and expect to administer it in time of war, especially, when it covers the scope that this covers, without first looking into all the details.

Mr. MAAS. Would you be in a position to testify this morning on this proposal?

Admiral MCINTIRE. No; I would not.

Mr. MAAS. Then, there is no use in having the admiral's testimony, Mr. Chairman, unless he is ready to give his views on it.

Admiral MCINTIRE. I do not like to come up here with snap judgment on anything.

Mr. MAAS. Has the Navy taken an official position yet on the proposed amendment? Has the Navy officially had a chance to study it? In other words, your explanation does not mean that the Navy has or has not endorsed this proposal?

Admiral GATCH. No; I do not think the Secretary has seen it yet.

Mr. MAAS. I am for something being done, but I am not sure we are not doing patchwork.

Admiral MCINTIRE. That is right. I have no objection to doing something about this.

Mr. MAAS. That is, with reference to the substitute bill?

Admiral MCINTIRE. Yes.

Mr. MAAS. This sounds all right, but I do not know without your advice. I suggest Mr. Chairman, that the Navy Department study this proposal and come before us when they have finished such study and tell us how it would operate. Then, too, they may have additional proposals to make in connection with it.

Admiral MCINTIRE. That is agreeable to me, Mr. Maas; in fact, I think that is sensible.

Mr. MAAS. I want to make sure we are getting the final word when we do get it.

Mr. RIVERS. Mr. Chairman, when can we reasonably expect further action on this?

The CHAIRMAN. I think the suggestion made by Mr. Maas and the Admiral is well founded. I think we are all practically in agreement as to what should be done, but we have got to study the matter, and I do not think that the Department should be called upon this morning to render a decision on the substitute without having made a careful study of it. It must be considered from the standpoint of the Navy as a whole. We must bear this in mind; that when this committee legislates, the whole scope of the Navy must be taken into consideration. What might be appealing to us oftentimes is a fine thing just for a certain part; but we have got to visualize the Navy as a whole and see how it applies and dovetails into the whole picture.

I should think that in the course of two weeks, three weeks or a month, the Navy Department ought to be able to advise us. Now, do not get into your minds the thought that I am trying to have an indefinite postponement; I am trying to help the matter along; but I think we can all reach a common ground where we can help, and I do think that we

ought to grant the Navy a reasonable time to look into the matter.

Mr. MAAS. It would certainly be much better from our standpoint if we worked out something that the Navy could endorse and then go to the House with the Navy's endorsement.

The CHAIRMAN. And with the full support of the committee.

Mr. MAAS. That is right.

The CHAIRMAN. Oftentimes, we start in here very much divided, but we all after a while work ourselves around, through the process of give and take, to the point where we try, in the discharge of our duties, to get out legislation which we think is acceptable. I think we can accomplish the same results in this matter, and I want it understood that no effort to delay this matter will be made, but that there will be a reasonable time granted in which to make a thorough investigation.

Mr. RIVERS. Let us ask the Surgeon General how long he thinks he should have to make a report, because we realize what his duties now are.

Admiral MCINTIRE. From my own standpoint, I have a number of things that are coming up this week and next week, and I shall have to be out of Washington for a part of that time.

Mr. MAAS. I think, with the critical stage of the invasion occurring right now, that we should not press you for a statement for a few weeks.

The CHAIRMAN. I suggest, then, members of the committee, that we refer this amendment to Mr. Rivers, to the Judge Advocate General and to the Bureau of Medicine and Surgery. We shall probably be in session for a considerable time from now on and can keep tab on this ourselves.

Admiral MCINTIRE. We will expedite this. We will do the best we can to go over this and get it back to you. I have no desire in the world to hold this thing up. However, I do not want to come here and give you opinions on things that I, at least, do not know about.

Mr. IZAC. The reason for this substitute is that you decided you did not like the first bill?

The CHAIRMAN. I did not decide it.

Mr. IZAC. I admit that it puts a lot of discretion in the hands of the Surgeon General.

Admiral MCINTIRE. No; it does not. That is the trouble with the thing. As it stands, it gives me a directive and then confuses me as to how it shall be carried out. Which one do you mean, Mr. Izac?

Mr. IZAC. The bill that was introduced.

Admiral MCINTIRE. That is what I object to. That gives me a flat directive to do one thing and then confuses me the rest of the way. I do not think you ever want legislation like that.

Mr. RIVERS. As far as I am concerned, that bill is out and there is a substitute.

The CHAIRMAN. I think, Mr. Rivers, that we can assure the dentists and the American Dental Association that something worth while will grow out of these hearings. We should not be too anxious. There is no desire on my part to delay it. Just let us approach it in an intelligent way and try to reach a solution as to which is the very best for the good of the service and the good of the profession.

Mr. RIVERS. How can we get this printed?

The CHAIRMAN. Let this amendment be printed as a committee document.

Mr. COLE. Before it is printed, I should like to voice my own opinion about one thing, namely, Congress' specifying the rank of the heads of these corps. I think the directors of the corps should be of equal rank, but it is not for us to say what that rank should be.

The CHAIRMAN. We always by statute fix the rank of the officer when we create a certain position; but that is a matter of mere detail in the consideration of the bill. The principle is the main thing that we should be concerned with. I think we have accomplished a great deal. I think we are indebted to Mr. Rivers, to Dr. Mead, to Admiral McIntire, to Admiral Gatch, and to all the other witnesses who testified here and helped us on it. We all see the situation a little clearer than we did at the outset. I feel that good results will come of this hearing. So let us refer this matter to the Judge Advocate General and Admiral McIntire. We shall call you back in a short time to give us your final judgment on it. In the meantime, please consult with Mr. Rivers and see if you can all reach an accord. Is that satisfactory to everybody? If so, let the substitute be printed as a committee document. That disposes of this matter for the present. Thank you very much, Admiral McIntire.

Members of the committee, it is necessary tomorrow morning that we have a hearing on the disposition of the Moore Air Field, because we have got to handle it in some way and must reach a decision. The oil companies are draining our land. The law of capture applies in the State of Oklahoma, and the oil belongs to whoever takes it out of the ground. It does not make a particle of difference to me which way we handle the situation; but let us do something and take it to the floor of the House, because if we sit quietly by, no one will have any oil.

Mr. MAAS. May I ask the chairman this question: Assuming that the committee does not report out the so-called Moore oil field bill, we will have to provide some alternative legislation?

The CHAIRMAN. That is right.

Mr. MAAS. If that is the case, I should like to ask that we have the alternative legislation before the committee tomorrow, so that we can act on both proposals.

The CHAIRMAN. All right. We shall have to do this: I think we shall have to get some

legal advice on that. I do not know whether the Secretary would have the authority to lease it or whether it should be operated at all. We will be advised about that. Of course, he has the right to sell it under the Second War Powers Act, coupled with the declaration in the Public Works Act that he must get clearance from the committee.

Please be ready to advise us on that, Admiral Gatch. If the committee decides not to turn it back, then we must do something to dispose of the question. That is what we shall have to do. If we do not, we will wake up and find that nobody has it except the oil companies. The Government will not have anything, and the private individuals will not have anything. So we shall have to reach a decision one way or another.

Mr. MAAS. Did I understand you to say that the Navy would have to have clearance from our real-estate subcommittee in order to sell it? That bill has not been passed.

The CHAIRMAN. Oh, yes; it has become a law.

Mr. MAAS. To sell it?

The CHAIRMAN. They have power under the Second War Powers Act to sell anything they want without the authority of Congress.

Mr. MAAS. Yes.

The CHAIRMAN. Then, we step in under the Public Works Act and provide there that they must have clearance from the committee. Everything relating to the Navy has got to come before the committee.

So, gentlemen, please be ready to advise us, if the committee rejects the proposal to turn it back. If the committee wants to follow the other course, we must act right away. So we shall have a hearing tomorrow.

Mr. IZAC. What was the action of the committee on the Monroney bill?

The CHAIRMAN. That is what will be brought up. That was a substitute to be offered to the Senate and House conferees. The House conferees said they did not want to deal with it because it was a question of legislation for the Naval Affairs Committee to bring up in a separate bill. Oil wells are being brought in around our property. If we are going to keep it, we will have to protect it.

Mr. COLE. Have the previous hearings been printed?

The CHAIRMAN. Yes; everything is printed and will be sent to all the members. We will ask that Mr. Courtney and Admiral Gatch and their witnesses be here in the morning at 10 o'clock. We must reach a decision on what we are going to do with Moore Airfield.

Mr. HARRIS. Is it your plan to have extensive hearings?

The CHAIRMAN. It all depends on the facts. I hope we can move fast, but we must not reach a hasty decision; we must act properly and reach a well-rounded decision. That disposes of everything except one bill which the Judge Advocate General is very anxious to have.

Captain RAMSEY. S. 1173, Suspension of Public Vessels Act.

The CHAIRMAN. We will take that up just as soon as we finish with the Moore Airfield proposition. I know of nothing else to come before the committee.

Mr MAAS. There is one other matter in which Admiral Jacobs is interested.

The CHAIRMAN. That has not been cleared in the Department.

Mr. VINCENT. Now, what about the matter which I brought up?

The CHAIRMAN. We have sent that to the Department for investigation and report.

Mr. VINCENT. Is that going to lay around?

The CHAIRMAN. No; it will not lay around.

Mr. VINCENT. I think it is a serious matter.

The CHAIRMAN. Let the committee go into executive session.

(At 10:30 a.m., the committee held an executive session, and further proceedings were not reported.)

(The committee adjourned at 10:45 a.m., to meet at 10 a.m. June 7, 1944.)

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NAVAL AFFAIRS,
Thursday, June 22, 1944.

The committee met at 9 a.m., the Honorable Carl Vinson (chairman) presiding.

The CHAIRMAN. Members of the committee, I hoped we would get through with this bill before 10 o'clock, and it is just 10 o'clock now, according to my watch.

I want to call up the Rivers bill. If members of the committee want it presented, we will present it now, or come back tomorrow morning, because I think it is only fair and right that we have a decision on that matter as soon as possible. I will be glad to accommodate the wishes of the committee on that matter.

Admiral McIntire, if you want to take it up now we will take it up now, or we will take it up tomorrow morning, whichever the committee desires.

The CHAIRMAN. Admiral, I asked you a few days ago to study the bill suggested to you by the committee, and we want to know if you have studied it and approve it, or if you have some other proposals you desire to submit to the committee.

(Concluded in July issue)

THE JOURNAL *of the* AMERICAN DENTAL ASSOCIATION

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THE ACCREDITATION OF DENTAL SCHOOLS

After more than five years of carefully planned work, the Council on Dental Education of the American Dental Association has completed its report[1] on the accreditation of dental schools in the United States. This is an important forward step because the guidance available to many persons through a list of accredited schools has been lacking for more than seven years.

The Council on Dental Education of the American Dental Association was established in 1937 as the successor to the Dental Educational Council of America. The three great groups that have an interest in the quality of dental education—the practitioners, the dental schools and the dental examiners—were each given three members on the Council through representatives elected by the American Dental Association, the American Association of Dental Schools and the American Association of Dental Examiners. In 1940, after two years of preliminary planning, the Council issued its "Requirements for the Approval of a Dental School."[2] Examination of the dental schools was started in October 1942, and was continued despite the declaration of war because of the urgent need for an accreditation of the country's dental schools.

The findings of the Council are rewarding and encouraging, but there should be no general acceptance of the notion that the quality of dental education is not subject to future improvement. Of the thirty-eight dental schools in the United States that were examined, thirty-six were placed on the "'list of accredited schools"

[1]See p. 663.

[2]Requirements for the Approval of a Dental School. The Council on Dental Education, American Dental Association, Chicago, 1941.

with twenty-four receiving "approval" and twelve, "provisional approval." This means that almost two-thirds of the schools examined met satisfactorily the basic requirements of the Council and that almost one-third could give sufficient evidence that they would be able to meet those standards in the predictable future. The Council's program includes a resurvey of various schools as soon as changing circumstances require.

Although this phase of the Council's work was chiefly concerned with accreditation, it will be productive of more than a list of approved dental schools. Out of the various analyses and examinations to which the schools and their methods were subjected will come valuable generalizations that will aid in determining the trend and rate of future progress. Each school, too, has had the benefits, through the Council's survey, of a critical self-examination, and efforts at improvement in many quarters can be expected in the immediate future as a direct result of the Council's activities.

The Council on Dental Education and its roster of members during the past seven years deserve the appreciation of the profession for this important advance in dental education. The secretary of the Council, Harlan H. Horner, has had a most valuable part in establishing the sound policies and methods under which the Council's program has gone forward. His knowledge and his experience, no less than his devotion to the progress of dentistry as a whole, have enabled him to guide the accreditation program to its successful completion.

In the years that lie immediately ahead, it is to be hoped that the Council's work will be reflected in higher standards of dental education, to the end that an improved dental practice can better serve the needs of the American people.

ENACT THE NAVAL DENTAL CORPS BILL

Bills to provide more efficient dental care for the personnel of the United States Navy by enlarging the administrative authority of the Naval Dental Corps are pending in both houses of Congress. Long existing inequalities that have hampered the efficient operation of the Naval Dental Corps can be removed by the passage of this legislation.

During the last session of Congress, a bill to attain the same objective was passed unanimously by the House of Representatives and was reported favorably by the Senate Committee on Naval Affairs. In the hearings on this bill, in both the Senate and the House, the highest ranking officers of the Naval Dental Corps testified frankly to the pressing need for such legislation. These facts point undeniably to the necessity for immediate and constructive action by Congress. This must no longer be delayed on the objection of naval officials that corrective legislation is undesirable and inconvenient.

The Surgeon General, in his testimony before the House committee, admitted the existence of certain inequalities; yet he actively opposed the bill and has made no move in the interval between sessions of Congress to correct the situation. The legislation now pending has been redrafted to meet certain objections urged by the Surgeon General and still retain the basic corrections that were sought. The Surgeon General now has an excellent opportunity to improve a situation which he himself has publicly recognized. It is to be hoped that he will acknowledge the splendid service that dental officers have given in every part of the world by actively supporting this legislation, which will enable the Naval Dental Corps to continue its labors without the handicap of discriminatory regulations.

DISPOSAL OF SURPLUS PROPERTY

The end of the war in Europe has made more pointed the many questions that have been raised in regard to the disposition of vast accumulations of surplus property that will no longer be needed by the armed forces. Much of this material, apart from the actual weapons of war, can be put to productive use in the peacetime, civilian economy. Planning and legislation are needed now to prevent some of the flagrant abuses which followed the sale of surplus property after the first world war.

It is entirely proper that dental officers who have used this equipment to do the biggest jobs that ever confronted the Army and Naval Dental Corps should be given special priority for the acquisition of surplus property. The House of Delegates of the American Dental Association, by resolution, has urged that first priority on dental equipment and materials be given to discharged military dental personnel at a special veterans' discount. Later priorities would go to dental schools, existing federal health and hospital services, state and local tax-supported health and hospital agencies, tax-exempt local hospitals and health agencies, the Red Cross and other federal and foreign health agencies.

Very little dental equipment and supplies have been declared surplus by the armed forces to date. The Surplus Property Board, the federal agency which will handle the matter, has not as yet drafted the rules and regulations which will govern the disposal of surplus property. The War Service Committee and Postwar Planning Committee of the American Dental Association has been in constant touch with the situation and representations on behalf of dental officers have been made to the proper government officials.

It is hoped that these efforts will be successful since the privilege of prior purchase pays only a small part of the debt to dental officers that should be recognized by a grateful country. The American Dental Association will continue to exercise every effort and every vigilance to make this possible.

THE FIRST VICTORY

The dramatic turn of events in Europe has properly brought a national feeling of elation over the complete success that has come to allied arms. But this feeling has been tempered by the fact that only the first victory has been won and that stern tasks are still ahead in other theaters of the war.

The battlefields of Europe and Africa will be quiet now during the restless interval that comes between the death and devastation of war and the sturdy noises of reconstruction. In other parts of the world, the fighting goes on. Millions of men continue to be engaged with the difficult job of waging war. In justice to them and to bring the day of total victory nearer for all, no efforts can be relaxed. The buying of war bonds, the continuation of essential wartime tasks and restraints and the undiminishing support of those still under arms are duties for every one until the second and final victory has been accomplished.

REPORTS OF COUNCILS AND COMMITTEES

THE STATUS OF DENTIFRICES

The Council has authorized publication of the following report.—*Donald A. Wallace, Secretary.*

A previous summary of the dentifrice situation[1] attracted so much favorable attention that the Council has decided to bring it up to date and to add further information about dentifrices. This information is designed to assist the dentist in answering questions that his patients may ask him about dentifrices.

Dentifrices that have been accepted by the Council are of known composition and may be relied on to clean the teeth safely and effectively when properly used with a well-designed toothbrush.

The most widely known brands of unaccepted dentifrices will be discussed in this article. If the composition of an unaccepted dentifrice has been kept secret or its composition is not known to be constant, little will be said about its ingredients. It is obviously impracticable to discuss the ingredients of a product that is subject to change without notice. This is the status of many unaccepted dentifrices.

Tooth powder usually consists essentially of abrasives, such as calcium carbonate, calcium phosphate and calcium sulfate, and detergents, such as soap and sodium alkyl sulfate, together with saccharin or sugar, and flavoring. Tooth pastes are similar in composition to tooth powder, except for the addition of water or alcohol and binding and stabilizing agents such as glycerin, propylene glycol and vegetable gums. Other ingredients may be added or ordinary ingredients may be present in excessive amounts, in order to produce the impression of therapeutic value; but dentifrices have no demonstrated therapeutic value, serving only to aid the toothbrush in cleaning the accessible surface of the tooth. The addition of substances for therapeutic effect may cause irritation or perhaps occasion an allergic reaction in sensitive individuals.[1a] It is therefore more conservative to choose a dentifrice for which no therapeutic effect is claimed.

While there are several strong objections to the composition of certain unaccepted dentifrices, the principal objection to them from the professional point of view is their advertising. Dentifrice advertising is the principal source of dental information reaching the public effectively today. This means that the impressions of the public with regard to dentists and dentistry, as well as the relatively unimportant product that is advertised are largely formed by dentifrice ads. The Council continues to consider dentifrices for acceptance in order that the health of the public may be protected. It is obvious that the health of the public is in jeopardy if people do not know what to do when symptoms of dental disease appear. If they read or listen to advertising for unaccepted dentifrices, they will be very likely to try this or that dentifrice when their gums begin to bleed or when persistently foul breath indicates that they are in need of professional care. While the dentist is often mentioned in advertising for unaccepted dentifrices, he is introduced in such a manner as to make him an accessory to the sales effort for the product, and the prospective

1. Dentifrices. J.A.D.A., 30:1767-1771, November 1, 1943.

1a. Gingivitis Following Use of Ipana Tooth Paste. J.A.D.A., 32:353, March 1, 1945; Sodium Perborate: Limitations of Use. J.A.D.A., 22:1761, October 1935.

purchaser is often led to believe that the dentifrice will supplant the services of the dentist to some degree.

In order to protect the public against false notions that may jeopardize dental health and to protect themselves against slanderous implications, all dentists should support the Council and the government agencies with which it cooperates in their campaign to clean up the dentifrice situation.

Calox Tooth Powder

Calox Tooth Powder is stated to consist of materials commonly used in dentifrices, with added sodium perborate and calcium peroxide, neither of which has been shown to be harmless or desirable in a dentifrice designed for unsupervised daily use by the public.

The advertising for this product has included many misleading slogans and statements.

Calox Tooth Powder is not acceptable to the Council.[2]

Colgate's Dentifrices

Colgate's dentifrices are Colgate's Dental Cream, Colgate Tooth Powder and Cue, a liquid dentifrice.

Colgate Dental Cream was accepted by the Council in 1930, but was deleted in 1934 as a result of the firm's violation of the Council's rules governing advertising of accepted products.

In 1940, the firm stipulated with the Federal Trade Commission that it would cease advertising unqualifiedly that "most bad breath begins with the teeth" or that "a safe, sure way to correct bad breath is through regular use of the thorough, cleansing action provided only by the special ingredients in Colgate's Dental Cream."

On September 5, 1944, the Federal Trade Commission announced another stipulation involving several products of the Colgate-Palmolive-Peet Company, including Colgate Dental Cream and Colgate Tooth Powder. In the provisions with regard to its dentifrices, the firm agreed to discontinue the following representations:

1. That the use of Colgate Dental Cream will impart to the teeth any radiance, brilliance, sparkle or like property beyond that inherent in the teeth of the individual user.

2. That the use of any of the respondent's dentifrices has any beneficial effect, except as a transitory mask, upon unpleasant breath odors other than those due to food particles or other matter in the mouth removable by the use of a toothbrush and the respondent's dentifrices.

3. That, in all cases, unpleasant breath odors due to the presence of decaying food particles in the mouth will be benefited by use of the respondent's dentifrices.

4. As "special," a foam or suds produced in the mouth of the user of any of the respondent's dentifrices due to the presence of soap; that is, a product of saponification of oils or fats.

5. That whether teeth are or are not properly brushed depends on whether the respondent's dentifrices are or are not used.

6. By use of the word "ordinary" or other words of similar import, with reference to other dentifrices, that such other dentifrices are common or ordinary by comparison with the respondent's and are inferior thereto.

7. That tooth decay will be prevented by use of the respondent's dentifrice.

Colgate's dentifrice advertising has frequently employed pictures of men dressed in the office attire of dentists. Such abuse of the prestige of the dental profession should be condemned.

The records of the Council office indicate that Colgate's dentifrices are of conventional composition. The firm has not supplied acceptable evidence that

2. J.A.D.A., 22:140, January 1935; 27:448, March 1940.

would support claims for their superiority in any respect. The firm has recently been asked for information concerning the composition of its dentifrices, and replied as follows in a letter dated November 18, 1944: "Replying to your letter of October 10 war restrictions and emergencies cause such changes in product formulation that anything we would send you might be out of date shortly after. Under the circumstances, we believe it best not to try to give you any formula information at this time." It seems that the firm would be well advised to discontinue claims that its dentifrices have special value when their composition is apparently so variable. Any scientific evidence that the firm might have accumulated with regard to its product when made by one formula would not necessarily apply to the product when made by other formulas.

Cue is not acceptable to the Council, since evidence that it is an effective dentifrice has not been presented.[3]

Forhan's Tooth Paste

Forhan's Tooth Paste, which is not acceptable to the Council, has been advertised for years as useful in the treatment of pyorrhea or gingivitis. The notorious "four out of five" theme has been frequently employed in the advertising of this product. A careful analysis conducted by the A.D.A. Bureau of Chemistry in 1942 failed to reveal the presence of any ingredient that might be therapeutically significant. In fact, Forhan's Tooth Paste was found to be an ordinary soap-chalk-glycerin mixture with coloring and flavors added. The Federal Trade Commission issued a complaint against the product August 23, 1943.[4]

3. J.A.D.A., 25:1854, November 1938; 27: 1310, August 1940; 29:135, January 1942; 31:1516, April 1, 1944.

4. J.A.D.A., 30:129, January 1, 1943; 30: 1954, December 1, 1943.

Iodent Tooth Pastes No. 1 And No. 2—Iodent Tooth Powder

The Iodent Tooth Pastes and Iodent Tooth Powder are dentifrices of conventional composition.

Iodent Tooth Paste No. 1 and Iodent Tooth Paste No. 2 were accepted in 1931. They were deleted in 1939 for failure to comply with Council requirements in regard to labels and advertising.[5]

Ipana Tooth Paste

Ipana Tooth Paste is not accepted by the Council. In 1942, the Council published a report in which the merchandizing policies of the Bristol-Myers Company, distributors of Ipana Tooth Paste, were critically discussed. Ipana has been the subject of numerous unfavorable reports issued by the Council and by various government agencies. A discussion of the most recent findings with regard to this product appears in the March 1, 1945 issue of THE JOURNAL under the heading "Gingivitis Following the Use of Ipana Tooth Paste."

Bristol-Myers Company is one of the few large distributors of dentifrices that have consistently refused to supply information with regard to the composition of their dentifrices to the Council office when requested to do so.

Information that the Council has accumulated through the A.D.A. Bureau of Chemistry and from other sources indicates that the product is a colored and flavored foam-producing soap-chalk mixture. In view of the lack of positive assurance that the product is of constant composition, it is difficult to make any definite statements with regard to its nature except that an effort appears to have been made by the firm in the past to keep the product uniform with regard to flavor, color, odor and physical consistency.

5. J.A.D.A., 26:1194, July 1939.

A critical analysis of the advertising for the product may be found on page 1769 of the November 1, 1943 issue of THE JOURNAL. The basic advertising theme has not changed since then. Many reports of irritation following use of the product are summarized in the report in the March 1, 1945 issue of THE JOURNAL, page 353.

Kolynos Dentifrices

Neither Kolynos Dental Cream nor Kolynos Tooth Powder is accepted by the Council. The dental cream was accepted for a time, but it was deleted from A.D.R. when the firm would no longer agree to obtain the approval of the Council for changes in the composition of its product. A report explaining the circumstances in detail was published in the May 1, 1944 issue of THE JOURNAL.

Listerine Dentifrices

Listerine Tooth Paste and Listerine Tooth Powder are not acceptable to the Council. The advertising for these products has included claims that their use will prevent, or lower the incidence of, tooth decay. The claims have been based on the presence of "Luster-Foam," a soap substitute used in the product.

There is no currently available scientific evidence that any inhibition or prevention of caries that may follow regular daily brushing of the teeth is due to the use of any foam-producing agent that may be contained in the dentifrice used.

Recent advertising for Listerine Tooth Paste carries the theme "Try this 'Prescription for your Teeth.'" This is an abuse of the word "prescription." The advertising copy implies strongly that the dentifrice is useful in the prevention of tooth decay. The firm has not supplied evidence to support such claims and the Council is not aware of any such evidence.[6]

6. J.A.D.A., 26:1709, October 1939.

Dr. Lyon's Tooth Powder

Dr. Lyon's Tooth Powder is of simple, conventional composition. Experiments conducted in the A.D.A. Bureau of Chemistry indicate that it is relatively abrasive when tested in the laboratory.

In 1942, the Federal Trade Commission issued a cease and desist order requiring the vendors, the R. L. Watkins Co., to stop "disseminating advertisements containing the statement 'Do As Your Dentist Does. . . .Use Powder,' or any other statement of like import. . . ."

The Commission found that the product was " . . . wholly without therapeutic properties. . . ."

The use of the prefix "Dr." in the title of the product may tend to create in the mind of the public the impression that the product is superior to other dentifrices that do not bear such a distinguishing mark. This practice is misleading and is discouraged by the Council. Dr. Lyon's Tooth Powder is not acceptable to the Council.[7]

Pebeco Dentifrices

Pebeco dentifrices are not accepted by the Council. Pebeco Tooth Paste was accepted in 1931 on the condition that advertising for the product would be revised and that the firm would undertake experiments looking toward the omission of potassium chlorate, or to reducing it in content. The product was deleted in 1933 when the firm reverted to an objectionable type of advertising.

Information received from the firm in 1942 indicates that its dentifrices are of conventional composition except for the presence of 10 per cent of potassium chlorate in the paste. In the opinion of the Council, potassium chlorate is not a desirable or necessary dentifrice ingredient.[8]

7. J.A.D.A., 29:2246, December 1, 1942; 27:1133, July 1940.

8. J.A.D.A., 20:2248, December 1933.

Pepsodent Dentifrices

Pepsodent Tooth Paste, Pepsodent Tooth Powder and Pepsodent Liquid Dentifrice were accepted by the Council in 1939, but were deleted in 1941 when the firm would no longer agree to abide by the Council's liberal rules with regard to advertising.

Exaggerated and misleading claims for Pepsodent Tooth Paste and Pepsodent Tooth Powder have characterized the firm's advertising for many years. The firm has attempted to endow "Irium," the soap substitute used in its products, with extraordinary virtues that it does not possess. Claims for polishing power and ability to remove "film" are also misleading and are based on inadequate evidence.[9]

"Remineralizing" Dentifrices

An unacceptable effervescent mixture commonly referred to as "Andresen's Formula" is currently available under a number of brand names. Perhaps the most prominent of these is Eff-Remin, an unaccepted product upon which the Council published an informative report in November 1939.[10]

The Food and Drug Administration issued a notice of judgment against the product in 1944.[11]

So far as the Council is aware, "Andresen's Formula" does not have therapeutic value.

Revelation Tooth Powder

Revelation Tooth Powder is not accepted by the Council. It is a dentifrice of conventional formula.

The advertising and label claims for this product have been brought more nearly into agreement with scientific evidence during recent years.

9. J.A.D.A., 28:639, April 1941.
10. J.A.D.A., 26:1887, November 1939.
11. J.A.D.A., 31:116, January 1, 1944.

Squibb Dental Cream

Squibb Dental Cream was accepted by the Council in 1931 and deleted in 1933 as a result of violation of the Council's rules with regard to advertising.

It is to be regretted that a firm which manufactures so many meritorious products should continue over the years to disseminate misleading information in regard to its dentifrice products. Claims for acid-neutralizing properties of Squibb Dentifrice are not substantiated by clinical evidence. The scare advertising in which the firm has indulged is definitely objectionable.

The firm was asked to supply information concerning the composition of its dentifrices for the information of the profession in 1942, but declined to do so. There is no evidence that Squibb dentifrices have any therapeutic value whatever.[12]

Teel

Teel Liquid Dentifrice is not accepted by the Council. There is available evidence that it is inferior as a cleaning agent to many of the popular brands of pastes and powders, and its use permits discoloration, which can be removed from the teeth only by a substance having abrasive properties.

Current lay advertising for Teel advises the weekly use of baking soda in addition to Teel without explaining why. Baking soda is an excellent dentifrice and its use would naturally aid in the removal of superficial stains that might have accumulated during the time when only Teel was used.

It has not, therefore, been demonstrated that Teel adequately performs the sole function of a dentifrice; namely, to aid the brush in cleaning the accessible surfaces of the teeth.[13]

12. J.A.D.A., 20:2248, December 1933; 29: 869, May 1, 1942.
13. J.A.D.A., 28:1682, October 1941; 30: 1109, July 1, 1943.

Conclusion

The listing as given above is by no means complete. There are eighty-three dentifrices listed in A.D.R. and nearly a thousand were on the market in the United States before the war.

An up-to-date statement of composition for any dentifrice that is accepted by the Council on Dental Therapeutics can be obtained by sending a letter or postal card to the Secretary of the Council on Dental Therapeutics, 222 East Superior St., Chicago 11, Ill. Such statements of composition are also published, with much other concise information, in the Council's book, Accepted Dental Remedies, which is revised annually and may be purchased from the American Dental Association for $1.

The Council's activities during the fifteen years of its existence have been partly responsible for improvement of most dentifrices from the standpoint of quality and, in many cases, in advertising as well. By its continued insistence on the elimination of unnecessarily abrasive substances from dentifrices, the Council has influenced even the manufacturers of unaccepted products to choose less harsh abrasive agents. The efforts of the Council have also resulted in the elimination of ingredients for which misleading therapeutic claims have been made, or to which many persons are sensitive. Such substances as pumice, prepared chalk, beta-naphthol, orris root and sodium perborate have been removed from many dentifrices. Of course, none of the accepted dentifrices contain such ingredients.

We no longer see such label statements as "Pepsin-containing tooth paste" (1929), "Special Film-Removing Tooth Paste" (1933), "Good for Tender Gums" (1934), "Preserves and Hardens the Gums" (1935), "Whitens the Teeth" (1935) and "Germicidal" (1939). The reader of this article will remember many misleading advertising statements that are no longer used, such as, "Whitens Teeth 3 Shades in 3 Days" (1930), "Quickly restores teeth to their natural gleaming whiteness by removing Bacterial-Mouth (you have it)" (1930), "Ziratol is an important ingredient" (1934), "The only Toothpaste which Detoxifies" (1934) and "Do As Your Dentist Does,—Use Powder" (1940). Oddly enough, the dentifrice that was labeled "preserves and hardens the gums" was advertised to dentists with the following headline, "We never make extravagant claims." The labeling was not reproduced in the advertisement to dentists.

The members of the profession can help to further the Council's dentifrice program by advising all of their patients to use only accepted dentifrices. A list of such dentifrices will be sent free by the Secretary of the Council to any one who requests it. Accepted dentifrices are obtainable at almost all drug, 10-cent and variety stores throughout the country.

COUNCIL ON DENTAL EDUCATION

MEASURING THE DENTAL STUDENT. I.

Committee on Aptitude Testing of the Council on Dental Education*

Many of us have watched with interest the increasing popularity of tests and other measuring devices. This upswing has been noticeable for some time, but, in recent years, sufficient progress and growth have been made and in so many different areas that even the most skeptical person cannot but be impressed. Many of the professions are discovering that evaluation instruments are extremely useful. It is the purpose of this article to direct attention to the use of tests and measurement in the dental schools and to describe the program that the Committee on Aptitude Testing is proposing.

There are many uses of evaluation and measurement in the dental schools. In this article, attention will be given only to the selection and use of data gathered at the time of the student's entrance. All dental schools gather some information regarding their students before they enter and gather additional information after the students have been admitted. This preentrance information includes many kinds of data, such as letters of recommendation, personal interviews, questionnaires, previous school records and test results. The deans and admissions officers study these data carefully, for, with this information, they must select for admission those students who will probably succeed. It is important to dentistry and to the record of the school that no mistakes be made. The needs of the profession are such that no school can afford to reject a good prospect and in his place accept a student who will not succeed.

Not every student who is admitted will have superior ratings in everything. For example, a student may have furnished evidence of having completed all the required predental courses and may have shown superior ability in all except chemistry. If the school feels that the student's weakness in chemistry is likely to affect his work, attention should be given to some kind of remedial instruction. The school should first be concerned with the selection of students who are likely to succeed and, that function having been accomplished, should do everything in its power to make it possible for each accepted student to achieve to the limit of his ability. Preentrance information is not only useful for the entrance committee, but, along with the data collected after admission, is also tremendously important if the faculty is to be assured that the student will succeed. It is important to remember that the usefulness of entrance data does *not* cease after the student has been admitted. These data should be used frequently by the administration and faculty because of their value in studying the student's growth and progress. While this paper is not intended to be an exposition on guidance and counseling, the relationship between the entrance testing program and the guidance program is too great to be passed over without some mention.

The tests commonly included in a bat-

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*Committee members: Bert L. Hooper, chairman, dean of the College of Dentistry, University of Nebraska; William E. Hahn, professor of anatomy, Dental School of the University of Maryland; Robert W. McNulty, dean of the School of Dentistry of Loyola University, Chicago; John T. O'Rourke, director of graduate and postgraduate studies, Tufts College Dental School; J. Ben Robinson, dean of the Dental School of the University of Maryland, and Ray V. Smith, professor of prosthetics, College of Dentistry, State University of Iowa.

tery of entrance examinations may be classified as either aptitude tests or qualifying tests. The purpose of the aptitude test is to predict the success or failure of the student, while that of the qualifying test is to measure those abilities or achievements which have been made conditions of admission, but which may or may not be a basis for predicting the student's success. The aptitude tests are able to predict the student's chances of success by determining the degree to which he possesses the ability for solving certain types of mental or manual problems. For example, dental educators assert that a dental student will probably get along best if, among other things, he has a good memory; if he can read technical literature with understanding; if he can visualize structural problems, and if he can manipulate his hands and fingers dextrously and adroitly. However, the mere suspicion that a characteristic such as a good memory is associated with success in dental education is not a sufficient basis for its inclusion in a test by which applicants are to be sorted. No test or group of tests, unless proved significant, should ever be used as a hurdle for entering students.

Schools that employ tests for selecting students should be cautious in interpreting the results of these tests. No school would refuse admission to a student solely because he did poorly on a certain examination if it knew that students receiving low marks on this test were just as apt to finish school with a good record as with a poor one. Such a test would be of no greater value than the tossing of a coin. The usefulness and reliability of the tests to be employed must be proved before dependence can be placed on their results. Therefore, the dental schools that give entrance tests for selecting their students should know whether they are being influenced by measures that may be as undependable as the tossing of a coin. The schools must study the successes and failures of their students over a period of years and, from such a study, determine whether they have observed facts about and behavior of their students that would have enabled them to make predictions early in the student's career. As should be emphasized, no one believes that any single paper-pencil test or any manual test can ever be a dependable basis for selecting students for dentistry or for any of the other professions. Neither does it seem practical that the scores from several tests can simply be added and thereby provide a simple accept-reject formula. Reliable prediction is not impossible, but undoubtedly use and experience will simplify and perfect what now appears to be a complicated procedure.

Dentistry is indebted to the many schools and their deans and faculties who have already given attention to the problem of testing and measurement in dentistry. While many individuals at the various schools have worked with testing problems at one time or another, there have been few long-term studies. Ray V. Smith and Harry A. Greene have prepared several dental aptitude tests and, for many years, have conducted extensive research[1, 2] in the Iowa University, College of Dentistry. Many of the Iowa tests have been used at other institutions. Harl D. Douglass and Constance M. McCullough conducted a study[3, 4] at the University of Minnesota that has contributed a great deal to dental aptitude testing.

1. Smith, R. V., and Greene, H. A.: Tentative Report on Aptitude Testing in Dentistry at University of Iowa. Proc. 10th Ann. Meet., Am. A. D. Schools, 1934, pp. 140-186.

2. Smith, R. V., and Freeman, H. J.: Report on Aptitude Testing in Dentistry at University of Iowa. Proc. 12th Ann. Meet., Am. A. D. Schools, 1936, pp. 214-228.

3. Douglass, H. R., and McCullough, Constance M.: Prediction of Success in School of Dentistry. University of Minnesota Studies in Predicting Scholastic Achievement. Part 2. Minneapolis: University of Minnesota Press, 1942, pp. 61-74.

The first committee on aptitude testing for the American Association of Dental Schools was appointed in 1932. At this time, a questionnaire was sent to the schools, and the thirty-five replies indicated that, while many were carrying on experimentation, "only four were using what might strictly be termed aptitude examinations." In 1944, the Council on Dental Education added the members of the Dental Schools Committee on Aptitude Testing to its own committee on aptitude testing.

On February 2 and 3, 1945, the Council's committee met with a number of consultants to consider plans for an aptitude testing program. The very nature of this program seemed to demand that it be a long-term project and that it be cooperative with as many of the schools as possible offering their assistance. Cooperation in this project is to be voluntary, but it is hoped that each dental school will fully understand (1) the objectives of the research program, and hence realize its importance, and (2) the importance of having all schools cooperate. Because it is vitally important, the cooperating schools must understand that, in a long-term program of this sort, they must not expect the first information received to provide a fool-proof method of accepting or rejecting applicants. In fact, it is to emphasize this point that the examinations are to be given only to students whom the school has already admitted.

The committee believed that while its important function was the study and development of aptitude examinations, it should consider the study of other entrance information. It felt that its program should furnish the school with information which its faculty could use for guidance and counseling if it so desired. After much deliberation, the committee decided that attention should be given to the following areas, provided reliable measuring instruments could be purchased or prepared to measure the student's:

1. Ability to read with understanding the type of material that he will be expected to read in dental school.
2. Ability to memorize verbal and visual material.
3. Knowledge of word meanings, both general and scientific.
4. Mental ability and ability to reason, as well as part scores on his linguistic and his quantitative ability.
5. Ability to visualize patterns and relationships without the necessity of preparing drawings of all these relationships. (Associated with this is the objective to measure the student's appreciation of artistic design.)
6. General cultural background, by measuring the knowledge of current problems in a number of areas.
7. Ability to express himself orally and in writing.
8. Ability to use his hands and fingers skilfully and dextrously.
9. Interests.
10. Personality (or to secure some record of it).
11. Perseverance.
12. Ability to coordinate muscular movements.
13. Social instincts.

The committee has asked Shailer Peterson, Ph.D., of the University of Chicago, to plan a testing program that can be administered in about one day and which will give attention to as many of the first eight of the above-mentioned areas or objectives as possible. It was understood that, for some of the objectives listed, existing evaluation instruments might be used; for others, new instruments would have to be prepared, and, for a few objectives, it might not be possible to make valid and reliable

4. McCullough, Constance M.: Prediction of Success in School of Dentistry at University of Minnesota by Means of Tests and Certain Other Factors. Doctoral dissertation, Graduate School, University of Minnesota, 1938.

measurements until after considerable research.

It is the committee's wish that the testing program get underway as soon as is practicable. The machinery for preparing and issuing the tests is to be conducted in the Council's offices in Chicago. The examinations themselves will be administered by a faculty committee on the opening day of school. The papers, answer sheets and registration records will be sent to the Council's offices, where the tests will be scored and the data tabulated, and a record of student performance will be returned to the school. All of these test data and predental records, and questionnaire information and the like, will then be studied and evaluated, and their relative value for prediction determined as the schools report student grades and honors at intervals. It should be emphasized that the statistical evaluation of these data will be made more meaningful by the cooperation of as many schools as possible, but the data from the different schools will be kept confidential. A school will receive only information about its own students and how they rated in comparison with the entire group of students tested.

The cost of this testing program will be borne jointly by the schools and by the Council. It is impossible at this time to estimate closely the cost of such a program, for no decision has been made on the tests that will be used; the number of students to be tested is not known, and the scoring and statistical machinery cannot be set up until some of these other factors are known. On the basis of other programs, it is assumed that the cost will probably be about two or three dollars per student. While some committee members thought that the schools would be willing to underwrite most of the expense, it was decided that the schools would be asked for only a token payment of one dollar per student tested. This fee can be paid by the school or it can come from the student's fees. When the program has been in operation long enough to allow its cost to be calculated, the problem of financing the program will be reconsidered.

In considering the cost of a testing program such as the one planned by the committee, several things should be kept in mind. This dental aptitude testing program, with its collection and handling of other entrance data, is a long term project with the goal of making available data that will prove useful for entrance and for guidance. It is recognized that new tests and new questionnaires will have to be prepared, and perhaps several will have to be constructed and administered before a really good battery of tests is discovered. All of this experimentation, validation and statistical interpretation requires both time and funds; and even after a reasonably efficient set of measures has been discovered, the program will need to be continued. Admissions officers who recognize that everything about the school, from its students to its curriculum, is constantly changing will never be content with an out-dated entrance program. They will insist on a periodic restatement of objectives, a review of their practices and an evaluation program that keeps in step with these ever-changing conditions. Even from year to year, new forms of the examinations must be supplied to reduce the chances of a student's or a group of students' ever learning what the battery is to contain.

All dental schools will admit that a cooperative program of testing such as the Committee in Aptitude Testing proposes is one that no single school could ever duplicate for the same expenditure even though the cost of the program for any school is apt to be more than if it were to purchase a group of available tests and have them scored by local, student help. Moreover, the proposed project is a program in which the cooperation of many schools not only re-

duces cost, but also increases the meaning and significance of the findings. Such a program opens a whole new field of evaluation, measurement and prediction in dentistry, for, with such an organization, the schools collectively and individually will be able to study problems that have never lent themselves to analysis before. Surely too, the dental educators will applaud this as an opportunity for Dentistry to make a lasting contribution to educational research and measurement in professional education.

It is hoped that faculty members and others interested in dental education will communicate with the committee and express their views on objectives that should be included in a comprehensive entrance testing program. There may be some who will be able to suggest tests or other measuring devices which they have tried and found useful. Others may have "hunches" or ideas relating to methods of measuring certain of these abilities and aptitudes.

In an early issue of THE JOURNAL, the committee plans to describe some of the measuring instruments that will be employed in this program and the ways in which these results and records can be used.

RESEARCH COMMISSION

VINCENT'S INFECTION: A REPORT BY A COMMITTEE OF THE RESEARCH COMMISSION

The committee appointed by the Research Commission of the American Dental Association to study and report on Vincent's infection with special emphasis on effective measures for treatment, submits the following report:

Classification

Vincent's infection may occur in the mouth in either an acute or an incipient form. In the acute form, there is gingival ulceration, pain, fetor, a bad taste and, at times, malaise and a rise in temperature. The intensity of these symptoms will depend on the extent of the involvement. This may vary from a few to a number of gingival papillae. It may also, on rare occasions, involve the inner surfaces of the cheeks, the tonsils and occasionally the tongue. Acute cases of Vincent's infection are easily recognized for, in the acute form, it is unlike any other gingival disease.

The incipient type of Vincent's infection is far more difficult of diagnosis and is often mistaken for marginal gingivitis, which, in its objectionable symptoms, it closely resembles. The most reliable diagnostic symptom in these cases is tenderness of the gingivae to touch and, in some instances, a "cupped out" appearance of the interdental papillae. The patient will frequently complain of this sensitiveness when brushing the teeth. When in doubt, an instrument should be passed into the gingival crevice about suspected areas. When there is no sensitivity, Vincent's infection can be ruled out, unless confirmed by other signs and symptoms.

Etiology

It has long been believed that Vincent's infection is caused by the presence of fusospirochetal organisms. There is no clear proof that this is so. Until confirmed by further investigation and experimentation, probably the most that can be said is that Vincent's infection is invariably associated with marked pro-

liferation of fusospirochetal organisms. All attempts to produce Vincent's infection in human subjects by direct transfer of material from human cases of acute infection have been unsuccessful. Positive smears are of little value in diagnosis unless confirmed by clinical findings. Oral sepsis and other conditions affecting the function of the gingival tissues, including consumption of tobacco and alcohol, seemingly constitute important predisposing factors in the infection and should be considered in treatment.

Communicability

In the early days, Vincent's infection, when less well known, was thought to be highly infectious. More recently, as a result of careful research, plus the observations and experience of many clinicians in the field, this theory has been largely discounted. On this point, Rosebury says that the etiology and pathogenesis of Vincent's infection suggest that it is probably not communicable, and there seems to be no clear or convincing direct or other evidence of the alternative. He writes:

> It is now known, however, that the microorganisms responsible for the characteristic symptoms of this disease occur widely if not universally in mouths. It is therefore unnecessary to postulate their introduction from the outside world as a prerequisite for the appearance of the symptoms. On the contrary, Vincent's infection seems to be one of a group of endogenous infections which, like subacute bacterial endocarditis or peritonitis due to intestinal perforation, are induced by ordinarily harmless surface parasites under particular conditions. These diseases as a group are not communicable.[1]

Treatment

The treatment of Vincent's infection may be considered from four points of view, preferably in the following order: *(a)* mouth sanitation, *(b)* mouth medication, *(c)* predisposing conditions and *(d)* postoperative care. Each plays a part in the success of treatment and should be given careful consideration. It is the general opinion of the committee that intravenous injections of arsenicals are of little or no value in the treatment of Vincent's infection. Moreover, since oral prophylaxis and the use of instruments play so large a part in treatment, Vincent's infection is a dental rather than a medical problem.

(a) Mouth sanitation is obviously of first importance. Vincent's infection, if at all advanced, is a painful disease, which makes brushing of the teeth a more or less painful operation. Consequently, patients with Vincent's infection brush their teeth indifferently or not at all. The result is increased oral sepsis plus exacerbation of symptoms. Of local predisposing conditions, oral sepsis is the most important. Obviously, therefore, the first step in treatment is to correct this situation by establishing mouth sanitation at the earliest possible moment. In the early days, when knowledge of the fusospirochetal organisms was limited, attempts at maintaining oral hygiene were discouraged in the belief that the use of instruments in the mouth might injure the already infected tissues and thus cause further infection. Increasing knowledge and wider experience in treatment have shown the fallacy of this belief.

The logical approach to treatment, therefore, seems to be along the lines of mouth sanitation. This should be undertaken at the first treatment and continued at each subsequent visit. Regarding the importance of this, one member of the Committee (H. T. D.) says:

> A point of seeming importance—often not followed by many operators—is the value of doing as much scaling as possible at the first sitting. The results twenty-four hours later are so uniformly good as to make one question procedures which rely on medicaments

1. Rosebury, Theodor: Is Vincent's Infection Communicable? J.A.D.A., 29:823, May 1942.

to the exclusion of operative procedures, while the disease is in the acute stage.

A thorough prophylactic treatment is not possible in acute cases, but much can be accomplished by the careful use of instruments, polishing agents and mouth sprays.

(b) In the treatment of Vincent's infection, medication plays a relatively minor part and so should be regarded as of secondary importance. On the assumption that the fusospirochetal organisms were the sole cause of Vincent's infection, treatment has been directed toward their eradication by such therapeutic agents as oxydizing compounds, escharotics, spirocheticides, astringents and dyes. Since there is at present no demonstrable proof that the fusospirochetal organisms are or are not the cause of Vincent's infection, it is the belief of the committee that the use of such therapeutic agents is more or less empiric and, in the light of present knowledge, is probably of less value than was formerly believed to be the case. This is not to say that one should not use his favorite medicaments as adjuvants if desired, but is to emphasize that they are of secondary importance in the treatment of Vincent's infection.

The increasing evidence that Vincent's infection may be a filth disease associated with lowered tissue tone and possibly complicated by bacterial invasion would seem to make the establishment of mouth hygiene the essential factor in treatment. Spraying the mouth at each visit with a solution of hydrogen peroxide U. S. P. diluted with two or three parts of warm water will aid in establishing mouth sanitation. This agent is used primarily for its effervescing properties, which aid in keeping the interdental areas free of debris and will probably meet most medication requirements. A prescription for a mouth wash of similar proportions may be given the patient with instructions for use every hour the first day and several times daily thereafter while under treatment. The patient should be seen in twenty-four to fourty-eight hours and further efforts at mouth sanitation should be continued until the mouth is cleansed as far as possible of calculus and food débris and the oral flora returned to normal. Where these procedures are efficiently carried out, the results are uniformly good, most subjective symptoms generally disappearing within twenty-four hours. Three or four treatments over a period of a week or ten days are usually all that is required.

(c) The predisposing factors in Vincent's infection might be divided into two groups: (1) those that affect the mouth directly, such as oral sepsis, tobacco, alcohol, overhanging margins of fillings, badly fitted crowns and bridges, partially erupted third molars and the like; and (2) those that may affect the gingival tissues through the circulatory system. The excellent results obtained in most instances by careful attention to local conditions with little or no attention to possible systemic complications are such as to lead one to believe that the systemic conditions may be of less importance than are the local predisposing conditions. In this connection, one of the committee members (H.T.D.) remarks:

> With respect to predisposing factors—local and systemic—only the broadest generalizations are possible at this time. Apparently abnormal physiology of the gingival tissues may be a predisposing factor in its pathogenesis. Important, however, as this general background may be, sight should not be lost of the equal if not greater importance of local conditions. Local treatment including meticulous attention to mouth sanitation, early removal of calculus deposits, careful attention to incubation zones, high level of patient cooperation, etc., are essential in the therapy of this condition.

(d) In the postoperative treatment of Vincent's infection, all are agreed that a "high level of patient cooperation" is

essential if satisfactory results are to be had. For this reason, patients should be carefully instructed in the care of the mouth. This is best done by a demonstration of the proper use of the toothbrush in the patient's mouth, plus prescriptions for the type of brush, dentifrices, waxed silk, etc., best suited for the patient's needs. The patient should be impressed with his responsibility in preventing a recurrence of the disease by having it made clear to him that oral sepsis and other conditions conducive to an unhealthy gingival tissue are important predisposing factors both in Vincent's infection, and in its recurrence.

It is believed that, if the foregoing procedures are carefully carried out, the results will be uniformly satisfactory. Each of the several steps in treatment has been tested by years of experience. They need only intelligent application to prove their value.—*H. Trendley Dean, G. R. Lundquist, Daniel F. Lynch, David W. McLean and Arthur H. Merritt, Chairman.*

LIST OF CERTIFIED DENTAL MATERIALS, REVISED TO MARCH 19, 1945

This revision of the list is based on tests in the laboratory and on a survey of the testing programs being carried on by the manufacturers. Products have been dropped from the list when the manufacturer has not carried on a testing program to maintain the uniformity and compliance of the product.

Additional materials, certified by the manufacturer and tested and found to comply with the A.D.A. Specifications, have been inserted in their proper places in this new printing.

Since the release of agar by the W.P.B., the hydrocolloidal impression materials have returned to the market and are now included.

In purchasing certified material for use in dental practice, these lists should be used as a buyer's guide. In addition, the package of material received should be checked for its exact name as given in the lists, and for a statement thereon guaranteeing compliance with the specification.

For details of the development of the Certified List, see THE JOURNAL, October 1939, pages 1725-1728.

Certified Amalgam Alloys (A.D.A. Specification No. 1)

Alloy	Manufacturer or Distributor
Accurate Metalloy (filings)	The L. D. Caulk Co.
Ackerman (filings)	Ackerman Dental Mfg. Co.
Argentum "A" cut, fine cut, medium cut, shavings	Hammond Dental Mfg. Co.
Aristaloy	Baker and Co., Inc.
Banner (filings)	Goldsmith Bros. S. & R. Co.
Blue Diamond (filings)	Reliance Dental Mfg. Co.
Certified	Lee S. Smith and Son Mfg. Co.
Cresilver	Crescent Dental Mfg. Co.
Dee (filings)	Thos. J. Dee & Co.
Diamond Edge	Young-Baker & Co.
Fellowship, New	Dental Protective Supply Co.
Fleck's	Mizzy, Inc.
Garfield's	Garfield Smelting and Refining Co.
Gold Bond	Jefferson Laboratories
Lustraloy Regular, Cut T	Pfingst & Co.

Minimax (filings) 173, 177, 178, 183, White Gold & Platinum; (shavings) 177, 178	The Minimax Co.
Mission No. 5, No. 5 "A" Cut, No. 6	Henry F. Bruce Co.
Modeloy (Quick Setting filings)	Crescent Dental Mfg. Co.
Mynol Improved	Mynol Chemical Co.
New Deal	Miller Dental Co.
Ney-Aloy, Ney's No. 125	The J. M. Ney Co.
Odontographic "Improved" (filings)	Odontographic Mfg. Co.
Pearlol	Wildberg Bros. S. & R. Co.
Research Oralloy	Precious Metals Research Works, Inc.
Royal Special First Setting, Super First Setting	Garhart Dental Specialty Co.
Silver Crown, Silver Crown Medium	General Refineries, Inc.
Silverloy (filings), (shavings)	Crescent Dental Mfg. Co.
Speyer	Speyer Smelting and Refining Co.
S-C Medium (filings), Quick (filings)	Stratford-Cookson Co.
S-R	Lee S. Smith & Son Mfg. Co.
Standard	Standard Dental Products Co.
True Dentalloy (filings), (cut "A")	The S. S. White Dental Mfg. Co.
Twentieth Century Regular, Special	The L. D. Caulk Co.
Uniform	Henry Nelms & Son
Vertex	Vertex Dental Products Co.
White Beauty	Lang Dental Mfg. Co.

Certified Inlay Casting Investments (A.D.A. Specification No. 2)

Investment	Manufacturer or Distributor
Kerr Cristobalite-Inlay	Kerr Dental Mfg. Co.
Ransom and Randolph Gray	The Ransom & Randolph Co.
Security Improved Inlay	The Cleveland Dental Mfg. Co.
Steele's-Super	The Ransom & Randolph Co.

Certified Impression Compounds (A.D.A. Specification No. 3)

Compound	Type	Manufacturer or Distributor
Certified	I	Lee S. Smith & Son Mfg. Co.
Dresch	I	The Ransom & Randolph Co.
Kerr Perfection, No. 2 Soft Green	I	Kerr Dental Mfg. Co.
Mizzy—Low Heat	I	Mizzy, Inc.
S. S. White—Black—Tray	II	The S. S. White Dental Mfg. Co.

Certified Inlay Casting Waxes (A.D.A. Specification No. 4)

Wax	Manufacturer or Distributor
Caulk-Blue	The L. D. Caulk Company
Kerr-Blue—Hard	Kerr Dental Mfg. Co.
Maves	Ohio Chemical & Mfg. Co.
Security	The Cleveland Dental Mfg. Co.
Sterling	Baker & Co., Inc.
Taggart's Green	Mizzy, Inc.

Certified Inlay Casting Gold Alloys (A.D.A. Specification No. 5)

Type A, Soft

Alloy	Manufacturer or Distributor
Aderer-A-Soft	Julius Aderer, Inc.
Baker Inlay Soft	Baker & Co., Inc.
Bruce "A," No. 1	Henry F. Bruce Co.
Chilcast No. 1	Vernon-Benshoff Co.
Crown Inlay No. 2 Soft, K	General Refineries, Inc.
Deeone	Thos. J. Dee & Co.
GB Inlay No. 1, Soft	Goldsmith Bros. S. & R. Co.

Jelenko Special Inlay	J. F. Jelenko & Co., Inc.
Krause Soft Inlay	Krause Gold Refinery
Research-A-Soft	Precious Metals Research Works, Inc.
Spyco Soft	Spyco Smelting & Refining Co.
S. S. White No. 2, No. 900, No. 940	The S. S. White Dental Mfg. Co.
Stern S	I. Stern & Co., Inc.
Williams No. 3, Will-Cast 22	The Williams Gold Refining Co., Inc.

Type B, Medium

Alloy	Manufacturer or Distributor
Aderer-B-Medium	Julius Aderer, Inc.
Baker Inlay Medium	Baker and Co., Inc.
Bruce "O," No. 2	Henry F. Bruce Co.
Chilcast M, 1M, 2M	Vernon-Benshoff Co.
Crown Inlay No. 1 Hard, Knapp No. 2, T	General Refineries, Inc.
Deetwo	Thos. J. Dee and Co.
GB Inlay No. 2 Medium Hard	Goldsmith Bros. S. & R. Co.
Jelenko Modulay, Platincast	J. F. Jelenko & Co., Inc.
Krause Hard Inlay	Krause Gold Refinery
Nelms E	Henry Nelms & Son
Ney-Oro A-1, A-10	The J. M. Ney Co.
Spyco Medium	Spyco Smelting & Refining Co.
S. S. White No. 1, No. 5, No. 820	The S. S. White Dental Mfg. Co.
Stern 1, No. 3290	I. Stern & Co., Inc.
Tinker No. 1, Inlay	Spyco Smelting & Refining Co.
Wildberg "A"	Wildberg Bros. S. & R. Co.
Williams Pioneer, Special Inlay	The Williams Gold Refining Co., Inc.

Type C, Hard

Alloy	Manufacturer or Distributor
Aderer-C-Hard, "Dressel"	Julius Aderer, Inc.
Baker Hard Inlay	Baker & Co., Inc.
Bruce No. 3, No. 5	Henry F. Bruce Co.
Chilcast No. 2, No. 2-H	Vernon-Benshoff Co.
Crown No. 9, Knapp No. 3, Supreme Inlay, TT	General Refineries, Inc.
Deesix	Thos. J. Dee & Co.
GB Inlay No. 3 Hard	Goldsmith Bros. S. & R. Co.
Jelenko Durocast, Firmilay	J. F. Jelenko & Co., Inc.
Krause KK.	Krause Gold Refinery
Research Hard Cast No. 5, Inlay	Precious Metals Research Works, Inc.
Spyco No. 6	Spyco Smelting & Refining Co.
S. S. White No. 8, No. 13, No. 860 Hard	The S. S. White Dental Mfg. Co.
Stern 2, 3337, 3465, 6485	I. Stern & Co., Inc.
Tinker No. 1H, No. 2	Spyco Smelting & Refining Co.
Wildberg "C"	Wildberg Bros. S. & R. Co.
Williams Klondiker, No. 1, Special "Four"	The Williams Gold Refining Co.

Certified Dental Mercuries (A.D.A. Specification No. 6)

Mercury	Manufacturer or Distributor
Argentum	Hammond Dental Mfg. Co.
Ballard's	Quicksilver Producers Association
Chemically Pure	The S. S. White Dental Mfg. Co.
Crown	General Refineries, Inc.
Dee	Thomas J. Dee & Co.
Dental	Goldsmith Bros. S. & R. Co.
Dental, C. P.	F. W. Berk & Co., Inc.
Fellowship	Dental Protective Supply Co.
Garfield's	Garfield S. & R. Co.
Garhart's Positively Pure	Garhart Dental Specialty Co.

Krause's Pure	Krause Gold Refineries
Minimax	The Minimax Co.
Mission	Henry F. Bruce Co.
Mynol	Mynol Chemical Co.
Ney's C. P.	The J. M. Ney Co.
Odontographic	Odontographic Mfg. Co.
Research	Precious Metals Research Works, Inc.
Spectropure	Baker & Co., Inc.
Twentieth Century	The L. D. Caulk Co.
Williams	The Williams Gold Refining Co., Inc. (Applies to Williams' one pound bottles only, as quarter pound containers are not glass.)

Certified Wrought Gold Wire Alloys (A.D.A. Specification No. 7)

Alloy	Manufacturer or Distributor
Aderer No. 1, No. 3, No. 4, No. 20 Clasp	Julius Aderer, Inc.
Baker 21, Q. A.	Baker & Co., Inc.
Crown Hylastic	General Refineries, Inc.
Deepep-Hard	Thomas J. Dee & Co.
GB Extra High Fusing, Medium Fusing, Regular High Fusing	Goldsmith Bros. S. & R. Co.
Jelenko No. 3 Wire, Super Wire	J. F. Jelenko & Co., Inc.
Ney-Oro Elastic No. 4, Neydium 9	The J. M. Ney Co.
Spyco No. 2, No. 4	Spyco Smelting and Refining Co.
S. S. White No. 12, No. 61 Metalba	The S. S. White Dental Mfg. Co.
Stern No. 2657	I. Stern and Co., Inc.
Williams No. 1 Super, No. 2 High Fusing Clasp, No. 3 High Tensile	The Williams Gold Refining Co., Inc.
Vernon-Benshoff Clasp Wire No. 6	Vernon-Benshoff Co.

Certified Zinc Phosphate Cements (A.D.A. Specification No. 8, First Revision)

Cement	Manufacturer or Distributor
Ames Z-M	The W. V-B Ames Co.
Bosworth's Zinc	Harry J. Bosworth Co.
Caulk Crown and Bridge, Petroid Improved, Tenacin	The L. D. Caulk Co.
Certicem	Lee S. Smith and Son Mfg. Co.
Fleck's Extraordinary	Mizzy, Inc.
Lang Dental Crown Bridge and Inlay	Lang Dental Mfg. Co..
S-C	Stratford-Cookson Co.
Smith's	Lee S. Smith and Son Mfg. Co.
S. S. White Silver Improved, Zinc, Zinc Improved	The S. S. White Dental Mfg. Co.

Certified Silicate Cements (A.D.A. Specification No. 9)

Cement	Manufacturer or Distributor
Ames Plastic Porcelain	The W. V-B Ames Co.
Astralit	Premier Dental Products Co.
Baker Plastic Porcelain	Baker & Co., Inc.
DeTrey's Synthetic Porcelain	The L. D. Caulk Co.
Durodent Enamel	Oskar Schaefer
Smith's Certified Enamel Improved	Lee S. Smith & Son Mfg. Co.
S. S. White Filling Porcelain Improved	The S. S. White Dental Mfg. Co.

Certified Hydrocolloidal Impression Materials (A.D.A. Specification No. 11)

Material	Manufacturer or Distributor
Deelastic	Thomas J. Dee and Co
Dentocoll	The L. D. Caulk Co.

Kerr Hydro-Colloid	Kerr Dental Mfg. Co.
Perfectocoll	Baker & Co., Inc.
Plasticoll	Lee S. Smith & Son Mfg. Co.
S. S. White Elastic Colloid	The S. S. White Dental Mfg. Co.
Surgident	Surgident, Ltd.

Certified Denture Resins (A.D.A. Specification No. 12)

Material	Form	Manufacturer or Distributor
Acralite	Clear, pink; powder-liquid	Acralite Co., Inc.
Ac-Ril	Pink, powder-liquid	Ac-Ril Dental Corporation
B-B	Clear, pink; powder-liquid	Bell Dental Products Co.
Coralite	Pink; powder-liquid	Coralite Dental Products Co.
Crystolex Form 102	Pink; powder-liquid	Kerr Dental Mfg. Co.
Densene	Clear, pink; powder-liquid	Cosmos Dental Products, Inc.
Justi-Tone	Pink; powder-liquid	H. D. Justi & Son, Inc.
Lang's	Pink; powder-liquid	Lang Dental Mfg. Co.
Lucitone	Clear, pink; plastic cake Clear, pink; powder-liquid	The L. D. Caulk Co.
Luxene 44	Pink; plastic cake	Luxene, Inc.
Marvel	Pink; powder-liquid	Marvel Dental Products Co.
Opalex "45"	Pink; powder-liquid	The Opalex Co.
Vernonite	Clear, pink; plastic cake Pink; powder-liquid	Vernon-Benshoff Co.
Vitacrilic D, L	Pink; powder-liquid	Fricke Dental Mfg. Co.
Vita-Lite	Clear, pink; powder-liquid	Vita-Lite Products Co.
Vitalon	Clear, pink; powder-liquid	Austenal Laboratories, Inc.

COUNCIL ON DENTAL HEALTH

STATE COUNCILS ON DENTAL HEALTH

The unity of purpose between the American Dental Association and its constituent societies is shown by the fact that state councils on dental health or committees with similar functions have now been organized in forty-six states and the District of Columbia.

The official records of the American Dental Association reveal that many committees of the Association have studied the dental health problem, but much of this effort in the past has been disconnected and was not aided by a close working relation with similar committees in constituent and component societies.

When the Council on Dental Health of the American Dental Association was organized, in August 1942, all constituent societies were requested to establish similar councils or committees so that a network of national, state and local councils could be used for the exchange of opinions and for the integration of work in all areas of the country. In less than three years, all but two state dental societies have complied with the request, either by establishing a council on dental health with functions similar to those of the national council or by assigning these duties to an existing committee.

A list of the chairmen of the state councils on dental health follows:

Alabama: Hunter S. Allen; *Arizona:* Norton J. Wood; *Arkansas:* M. H. Gray; *California:* Charles A. Sweet; *Southern California:* Bruce Kurtz; *Colorado:* Z. T. Roberts; *Connecticut:* Ira D. Beebe; *Delaware:* Charles Pierce; *District of Columbia:* John A. O'Keefe; *Florida:* D. H. Turner; *Georgia:* Homer Davis; *Idaho:* E. S. Robison.

Illinois: Lloyd H. Dodd; *Indiana:* Edward L. Mitchell; *Iowa:* O. E. Hoffman; *Kansas:* Leon R. Kramer; *Kentucky:* M. C. Newlon; *Louisiana:* S. B. Gore; *Maine:* Raymond A. Derbyshire; *Maryland:* M. K. Baklor; *Massachusetts:* Harold J. Cronin; *Michigan:* Kenneth A. Easlick; *Minnesota:* I. A. Epstein; *Missouri:* James F. Alcorn.

Montana: W. L. Beal; *Nebraska:* F. W. Leonard; *Nevada:* O. M. Seifert; *New Hampshire:* Perley H. Roberts; *New Jersey:* F. J. Houghton; *New Mexico:* Paul Henry; *New York:* George E. Davis; *North Carolina:* John R. Pharr; *North Dakota:* L. C. Andersen; *Ohio:* Leroy Johnson; *Oklahoma:* Frank P. Bertram; *Oregon:* P. T. Meaney; *Pennsylvania:* H. K. Willits; *South Dakota:* F. M. Matteson; *Tennessee:* C. L. Sebelius; *Texas:* J. W. Outlaw; *Utah:* Walter Gillespie; *Vermont:* Norman F. Johnson; *Virginia:* A. M. Wash; *West Virginia:* J. B. Poindexter; *Wisconsin:* G. J. Mortell; *Wyoming:* James Pepper.—*Allen O. Gruebbel, Executive Secretary.*

COMMITTEE ON LEGISLATION

U. S. CIRCUIT COURT OF APPEALS UPHOLDS TRAYNOR LAW

The conviction of the United States Dental Company for violating the Traynor Law was upheld recently by the United States Circuit Court of Appeals. The United States Dental Company claims to be the world's largest makers of dentures and has advertised extensively throughout the United States.

The main arguments offered by the company were that a dental laboratory could not violate any law if its customers make impressions of their own mouths and the dental laboratory receives such impressions through the mails, constructs dentures therefrom and mails them back to the customer.

Secondly, they said that the Traynor Law, if it prohibited such action by a dental laboratory, must be declared unconstitutional because, they said, no law may constitutionally prevent a person from taking an impression of his own mouth.

Thirdly, they said that the Traynor Law is unconstitutional because it unduly restricts the operation of a dental laboratory to making dentures from casts made by licensed dentists, and therefore it is a denial of an individual's right to do business.

Lastly, they said that the Traynor Law was an attempted regulation of dental laboratories, passed in response to an economic pressure group and not justified under the states' police power, and they severely criticized and censured the dental profession, the state dental societies and the American Dental Association.

In the decision, the United States Circuit Court of Appeals said that it was unnecessary, it felt, to dwell at length on any of the dental company's arguments. The court would be willing to consider, for the purpose of argument, that no law which prohibits a person from taking an impression of his own mouth could be constitutional, yet, notwithstanding that fact, the dental company went much further than that and, in doing so, violated statutes that are valid. The court was not willing to underestimate the value of a dentist's services, or the necessity for their state licensing to insure a reasonable standard of dental skill and knowledge.

The court further said:

The states of Indiana, Michigan and Wisconsin (among others) have seen fit, in the wisdom of their legislators, to protect their

citizenry from the lay public's practice of dentistry. The Federal Government has cooperated and endeavored to bolster the states' policy by the passage of the Act prohibiting the mailing of dentures into a state which prohibits dentures made by lay folks without expert dental supervision, from being made and sold.

Appellants [laboratory owners] fail to see, or profess not to see, the necessity for intelligent and skilled construction of artificial teeth. To the open-minded, the wisdom of this kind of legislation seems quite obvious. It falls within the category of legislation for the public health which is a prime, as well as a worthy, purpose of Government. That the Federal Government, under its interstate commerce power, may aid such state legislation is not debatable. Such legislation is constitutionally unchallengeable.

It is anticipated that the United States Dental Company will appeal this case to the United States Supreme Court, where a decision is expected within about a year.

COUNCIL ON DENTAL THERAPEUTICS

NEW ARTICLES IN LIST OF ACCEPTED DENTAL REMEDIES

The Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following articles in the list of Accepted Dental Remedies:

*Anesthetics—Local**

Procaine HCl 2%, Epinephrine 1:25,000: Composition: See S. F. Durst & Co.†

Procaine HCl 2%, Epinephrine 1:50,000: Composition: See S. F. Durst & Co.†

Manufactured by S. F. Durst & Co., Philadelphia, Pa. Distributed by Abe Bass, New York, N. Y.

Dentifrices

"Our Own" Tooth Powder: Composition: Each 100 Gm. contains precipitated calcium carbonate (Non-Fer-Al Brand), 84.72 Gm.; sodium bicarbonate, 4.08 Gm.; soap, 7.02 Gm.; magnesium carbonate, 4.08 Gm.; saccharin, 0.1 Gm.; 2.0 Gm. of a mixture of methyl salicylate and oil of peppermint is added.

Manufactured by The Stevens-Wiley Manufacturing Co., Inc., Philadelphia, Pa.

Admission of a product to the list of Accepted Dental Remedies means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics. All information is available upon request and inquiries are welcomed. A postal-card inquiry will bring a prompt reply.—*Donald A. Wallace, Secretary.*

*A.D.R. Ed. 10, p. 39.
†J.A.D.A. 31:1125, August 1, 1944.
‡A.D.R. Ed. 10, p. 95.

NEWS OF DENTISTRY

Blackerby Appointed Dental Director of Kellogg Foundation

The appointment of Philip E. Blackerby, Jr., dean, School of Dentistry, University of Louisville, as dental director of the W. K. Kellogg Foundation has been announced by Emory W. Morris, general director. Dr. Blackerby will assume his full-time responsibilities with the Foundation July 1.

The Kellogg Foundation has evidenced considerable interest in graduate and postgraduate dental education in recent years and has aided in developing a program in this field at the University of Michigan. The Board of Trustees of the Foundation has recently made an appropriation to assist a selected number of dental schools in this country and Canada to develop more adequate facilities for graduate and postgraduate education. The Foundation's participation will be in the nature of outright grants to the schools for a period of three to five years. The funds will be used principally for the expansion of dental faculties to enable them to take on the increased load that will result from the initiation of a comprehensive program in this field. A similar program is being developed for schools of medicine and nursing. It is expected that the Foundation's program will be helpful in developing graduate and postgraduate courses for returning dental officers, many of whom have expressed a desire for such instruction.

Dr. Blackerby, whose first responsibility will be to develop this program, has been dean of the School of Dentistry, University of Louisville, since 1944. He was graduated from that institution in 1933 and took postgraduate work at the University of Illinois and the University of Michigan. He served as director of the Bureau of Public Health Dentistry of the Tennessee Department of Public Health from 1936 to 1942. From 1942 to 1945, he was professor and head of the department of oral pathology and diagnosis at the School of Dentistry, University of Louisville.

Creighton Reconsiders Decision to Close for Duration of War

The Creighton University has reconsidered its recent announcement of the closing of the School of Dentistry at the end of the present academic year, according to a statement by the Rev. Thomas B. Bowdern, S.J., president, who had previously announced that the school would suspend for the duration. The change of decision, the president said, was "due to unforeseen manifestations of interest and the pledge of support" on the part of various dental and civic organizations. The "lack of prospective students and the difficulty of maintaining an adequate number of full-time instructors on the teaching staff" prompted the earlier decision by the board of trustees of the university.

Active support of the school has been promised by the Nebraska State Dental Association, the Omaha District Dental Society, the Creighton Alumni Association and various social and civic agencies.

A program of expansion is now being planned by the school of dentistry, and the university, President Bowdern said, will take steps to meet the conditions as prescribed by the Council on Dental Education of the American Dental Association. A resurvey (of the school of dentistry by the Council) will be requested at an early date.

The school of dentistry was established as a department of Creighton University in 1905.

Changes in Personnel of Army Dental Corps

Three Dental Corps officers of the Regular Army have been placed upon the retired list of the military establishment, all on account of physical disability. Those retired, with last duty assignments indicated, include the following: Col. Wm. A. Squires, dental surgeon at Camp Campbell, Ky.; Col. Samuel J. Randall, dental surgeon of the 5th Service Command, Fort Hayes, Columbus, Ohio, and Col. E. Frank Sharp, dental surgeon at Camp Custer, Mich.

A number of majors of the Dental Corps have been promoted to the grade of lieutenant colonel. They are, with station assignments indicated, as follows: Lt. Cols. Jacob L. Albough, 61st General Hospital; Joseph F. Herman, 74th General Hospital; Albert Lange, 103d General Hospital; William E. Tripp, 111th General Hospital; Lionel M. West, 192d General Hospital; George B. Geller, 141st General Hospital, c/o Kennedy General Hospital, Memphis, Tenn.; Emil H. Bollwerk, 420th AAF, March Field, Riverside, Calif.; Le Roy M. Fink, Fort Sheridan, Ill.; Robinson C. Frost, 112th General Hospital, Fort Devens, Mass.; Fayette G. Hall, 188th General Hospital, and Loyd H. Hupp, 262d General Hospital.

Army Dental Officers Eligible for Professional Training Courses

Army dental officers who have had limited opportunities for practice during the period of active duty will be given an opportunity to take professional training courses, according to a recent announcement from the Dental Division, Office of the Surgeon General. Dental officers who have served overseas will be given priority, but the courses will not be limited to such officers. The text of the Army announcement follows:

According to an ASF Circular No. 155, May 1, 1945, Part One, Section II, refresher professional training is authorized for officers of the Army Dental Corps, who because of assignments to command, administrative or limited professional duties have not been engaged in the professional aspects of general dental service during the past twelve months or more. The training will be voluntary and priority for such training will be given to those officers who have served overseas. However, training will not be limited to those who have served overseas.

The refresher training is not intended for the specialist or the general dental officer who wishes to take some special work in exodontia, oral surgery, prosthetics or operative dentistry, but is set up for the dental officer who is interested in spending about three months on a rotation basis in all phases of general dental service.

A maximum of five dental officers will be given training in an ASF general hospital, and twenty-four hospitals have been approved in the Continental United States.

Requests for this training will be initiated by the individual officer concerned, who believes that he is eligible, and submitted through proper channels.

Officers selected for this training will be ordered on temporary duty, with *per diem*, for a period of not more than twelve weeks.

Officers Named for American Association of Endodontists

The following have been selected by the American Association of Endodontists as officers for the coming year: president, Robert G. Kesel; president elect, E. G. Van Valoy; vice president, H. B. Johnston; secretary, J. R. Blayney; treasurer, S. Levy; editor; W. B. Ingersoll; executive committee: to 1948, M. S. Aisenberg, R. R. DeKruif and E. A. Jasper; to 1947, E. D. Coolidge, G. C. Sharp and M. F. Yates; to 1946, R. L. Girardot and two members to be elected to fill the vacancies created by the resignation of Drs. Van Valey and Johnston on their election as president elect and vice president, respectively.

Report on Jaw and Face Casualties in British Army

The following report on the treatment of jaw and face casualties in the British Army has been released through the Dental Division, Office of the Surgeon General, U. S. Army.

In North Africa, all British maxillofacial casualties were concentrated in one center in Algiers, while in Italy all such casualties for the west coast were designated for Naples. The British maxillofacial unit provided a forward section that was able to hold its cases for three to five days before evacuating them by air to the main section bases in Algiers or Naples, where intermediate care and late repairs were afforded.

Seven hundred of the 1,000 fractures of the jaws were the result of missile wounds. Forty per cent were due to mortar, about 30 per cent to shell and bullet, and less than 5 per cent each to grenade and bomb. Three hundred of the fractured jaws were closed cases, caused chiefly by vehicle accidents, including battle casualties, while about one-third were the result of other accidents.

Fixation Employed by the British Unit

Cases treated by cast metal splints	397
Cases fitted with metal splints	847
Cases treated by dental wiring	500
Cases treated by alveolar and circumferential wiring	45
Cases treated by interosseous wiring	15
Cases treated by Roger Anderson extra oral pins	15
Cases treated by POP headcap, cast metal splint and external rods	38

Method.—The following opinions have been expressed by the British in the Mediterranean theater:

1. Wiring is best for all missile injuries, since it is a quick method in expert hands. The eyelet wiring (quickest method) has been the most widely used method. The caliber of wire generally used is 0.5 mm. stainless steel for the eyelets and double thickness 0.35 mm. stainless steel wire for I.M.F. Three pairs of eyelets are usually enough for the average case. In multiple fractures, up to six pairs may be used.

2. Interosseous wiring in edentulous posterior fragments has proved to be very successful.

3. Elastics, used less frequently than wire fixation, are reserved for cases requiring gradual reduction.

4. Sectional cast silver closed cap splints, fitting closely around the gum margins, are standard splints for definitive fixation.

5. The Roger Anderson pin fixation appliance is unsuitable for early treatment of shell wounds with major bone gaps, since the pins seldom remain firm for more than ten weeks, and then deformity occurs on their removal.

Deaths.—The British state that in a series of 1,000 jaw fractures (Mediterranean Theater) thirty-three deaths occurred. In fourteen, the death was due to an associated injury of the brain or of the spinal cord; while in four other patients, the maxillofacial injury was not the major factor in the death.

The gross mortality for maxillofacial casualties with bone damage is between 1 and 2 per cent.

Comparison.—The figures on the cause of the maxillofacial wounds (mortar, shell, etc.) are about the same in the British and United States forces in the Mediterranean Theater. The U. S. Army maxillofacial casualties in Italy comprise approximately 5 to 8 per cent of total battle casualties.

The surgical policies of the two are in agreement on the desirability of primary suture of the soft parts.

In the United States Army, the continuous loop wiring method has been employed almost to the exclusion of other technics.

Few edentulous American soldiers with jaw fractures have been encountered.

The mortality in United States maxillofacial casualties (1,539 cases), from January through May 1944, was 0.6 per cent (ten deaths). The British had thirty-three deaths in 1,000 cases, which included maxillofacial wounds, and, of this number, fifteen cases, or 1.5 per cent, were fatal, the result of strictly maxillofacial injuries.

Report of Cases.—A U. S. Army general hospital in Italy made the following report on causes of fracture of the jaw, as well as the type of fixation employed in treatment. The interim was from September 15, 1943 to March 15, 1944.

Jaw Fractures: Cause, Type and Treatment

Fractures resulting from missiles	63
Fractures resulting from blunt force	27
Battle casualties	73

Nonbattle casualties	17
Fractures involving mandible	54
Fractures involving maxilla	19
Fractures involving zygoma	12
Fractures involving multiple facial bones	5
Cases treated with loop wiring and intermaxillary elastic traction	38
Cases treated with external pin fixation	5
Patients returned to duty	47

Report Tells of Jap Army Dental Service

The organization of the dental service in the Japanese Army has been described in the following report recently issued by the Dental Division, Office of the Surgeon General, U. S. Army.

According to a report received from the South West Pacific Areas, dental treatment in the Japanese Army prior to 1941 was provided by civilian dentists. The Dental Corps of the Japanese Army was organized in 1941 under the direction of the medical department with a major general as chief dental surgeon.

Since 1941, dentists who graduate from dental school are called into service, and they enter the army on probation with the rank of second lieutenant. After the probation period, they enter the Army Medical College at Tokyo, where they receive training for three or more months, the time depending on the need for dental officers in the army.

Dental officers are held responsible for training dental noncommissioned officers. The noncommissioned officers perform some professional services, and they apparently are individuals who have had some civilian experience as dental apprentices, students or dental technicians.

It is reported that there are two dental officers, two dental noncommissioned officers and two dental assistants assigned to Army general hospitals.

The line of communication hospitals, which usually have 1,000 beds, have at least one dental officer and some enlisted personnel.

The field hospitals, ordinarily 500 bed capacity, have one dental officer and enlisted personnel. These hospitals, generally attached to divisions, are very mobile and dental service is limited.

Each division has two dental officers, but the nature of their duties is unknown. There is no documentary evidence that dental officers are assigned to regiments, battalions, line of communication headquarters or supply units. It is assumed that only emergency dental treatment is provided for such units by trained enlisted personnel.

It was reported that the Japanese soldiers have considerable trouble with dental caries and gingivitis, and that treatment is often rendered by medical officers. It was stated that the soldiers usually prefer this because, prior to the establishment of the Dental Corps, the medical officers furnished most of the dental service, which consisted principally of extractions and treatment of infectious conditions.

The equipment of the Japanese dental officer is reported to be good and in adequate amounts. There has been no evidence of availability of prosthetic dental treatment in any dental installation.

Fillings are made of metal and a composition material believed to be some type of acrylic or cement.

The dental kit used by medical and dental officers and perhaps the trained noncommissioned officers is shown herewith. The metal case and all items appear to be of noncorrosive material. There is one elevator handle, which is interchangeable to fit four elevator tips. The two broach holders have hollow handles that hold spare broaches. The forceps are so designed as to be universal.

Research Assistant Post Offered by California

An appointment as research assistant is available in the University of California College of Dentistry, Division of Dental Medicine, beginning June 30 and continuing for one year, with possible extension for an additional year. The position is designed primarily for dental graduates with an interest in research and in teaching. Requirement for the dental degree may be waived if other qualifications justify it. The basic salary is $1,500 a year. Application forms can be obtained from the dean.

BOOK REVIEWS

Fundamentals of Internal Medicine. By Wallace Mason Yater, A.B., M.D., M.S. in (Med), F.A.C.P., Professor of Medicine and Director of the Department of Medicine, Georgetown University School of Medicine; Physician-in-Chief, Gallinger Municipal Hospital, Washington, D. C.; formerly Fellow in Medicine, the Mayo Foundation. 1245 pages, 275 illustrations. Price $10. New York: D. Appleton-Century Company.

This medical textbook is concisely written, although complete and inclusive of important details. The text is well organized and thoroughly indexed with cross references. The discussion of each disease is orderly, giving the definition, cause, pathology, symptoms, differential diagnosis and medical management. Surgical diseases are briefly discussed among the diseases of each anatomic system. The style of writing is simple, clear and straightforward. A fair number of black and white cuts illustrate the text, and much related information is clearly set forth by tables.

One chapter is devoted to sulfonamide therapy, and the practical information concerning treatment by means of this group of drugs is set forth clearly in tabular form. Because it is concise and clearly written, includes facts of practical value and is shorter than other texts on medicine, this text will serve as a handy reference book for dental students and dentists.

Health and Hygiene. By Lloyd Ackerman, Western Reserve University, Cleveland, Ohio. 907 pages. Price $5. Lancaster, Pa.: The Jaques Cattell Press, 1943.

Here is a comprehensive book on hygiene. The author has brought together from innumerable sources all sorts of information, data and statistics relative to health in its broadest sense. Many of the facts are unusual, and the complication of data and writing of the book was surely a prodigious task. The scope of the text is wide. A consideration of the history and development of medicine is included, and considerable space is given to the hygiene of the emotions and to mental hygiene. It is stated that this is a book for the general public, but later that it is a book for "thinking Americans." One doubts whether it is a book for the general public, as the average reader would not be interested in the compiled data and the discussions of rather general nature. Instead of being a "rule book" for health, it sets forth information from which conclusions may be drawn, as well as making specific suggestions. The book will be welcomed by those who are concerned with any aspect of the general health of people. The style is simple, interesting and straightforward.

The Practice of Medicine. By Jonathan Campbell Meakins, M.D., LL.D., Brigadier, Deputy Director General of Medical Corps, Royal Canadian Army Medical Corps, Professor of Medicine and Director of the Department of Medicine, McGill University; Physician-in-Chief, Royal Victoria Hospital, Montreal, formerly Professor of Therapeutics and Clinical Medicine, University of Edinburgh; Fellow of the Royal Society of Edinburgh; Fellow of the Royal Society of Canada; Fellow of the Royal College of Physicians, London; Fellow of the Royal College of Physicians, Edinburgh; Honorary Fellow of the Royal College of Surgeons, Edinburgh; Fellow of the Royal College of Physicians, Canada; Fellow of the American College of Physicians; Honorary Fellow of the Royal Society of Medicine. 1462 pages; 517 illustrations including forty-eight in color. Price $10. St. Louis: The C. V. Mosby Co., 1944.

The fourth edition of this textbook of Medicine by Dr. Meakins, noted Canadian physician, is a comprehensive guide to a study of medicine. The book, which has been revised four times since 1936, has been kept modern and includes discussions of the use of sulfonamides and penicillin and consideration of many pathologic states made common by the war.

The author introduces his book with a

philosophic consideration of symptomatology, diagnosis, prognosis and treatment. The various disease entities are then discussed and classified according to anatomic location; diseases of the nasopharynx and mouth, larynx and bronchial system, lungs, circulatory system, hematopoietic system, etc.

Dr. Meakins' approach to diagnosis is interesting. He discusses the importance of "symptoms" and attempts to classify them. He made a study of 1,000 patients, and found forty-nine different complaints. In 52 per cent of the cases, pain in one form or another was present, and the next most common symptoms were weakness, loss of weight, fatigue, shortness of breath and fever. The author has more than adequately discussed the wide variety of subjects that must be included in a textbook of medicine.

Dental Treatment of Maxillo-Facial Injuries. W. Kelsey Fry, L.D.S., Consulting Dental Surgeon to the Royal Air Force; P. Rae Shepard, L.D.S., Dental Surgeon, East Grinstead Maxillofacial Unit; Alan C. McLeod, D.D.S., L.D.S., Dental Surgeon, East Grinstead Maxillofacial Unit, and G. J. Parfitt, L.D.S., Dental Surgeon, East Grinstead Maxillofacial Unit. Cloth. 428 pages. Illustrated. Price $6.50. Philadelphia: J. B. Lippincott Co., 1942.

This book, which previously appeared in an English edition in two separate volumes and was reviewed as such in THE JOURNAL, is a new American edition combining the previous two books in one. It gives the experiences and results of the authors in the treatment of a large number of war injuries of the jaws of all types, and is probably the best account to come out of this war of the methods and means of handling and controlling gunshot wounds of the jaws. A number of concepts are introduced by the authors for simplification and classification of the types of fractures found, which will be of assistance to those reading the work. The book opens with chapters on anatomic considerations, types of fractures, x-ray technic and mechanism of repair. From there on, each type of fracture is exhaustively, though concisely dealt with. The book is profusely illustrated with both line drawings and photographs, which enhance the discussions. A further feature of the volume is the final section on case studies in which a chronologic discussion of patients under treatment, together with pertinent illustrations, is dealt with. The entire book is clearly and concisely written. Perhaps more accent is placed on splints than would be found in American works, but, in general, the book reflects the high standards of dental care those with maxillofacial injuries have received at the hands of the authors.

Intravenous Anesthesia. R. Charles Adams, M.D.C.M., M.S. (Anes.), Associate in Section on Anesthesiology, Mayo Foundation for Medical Education and Research, Graduate School University of Minnesota, Rochester, Minn. 663 pages, with 75 illustrations. Price $12. New York: Paul B. Hoeber, Inc., and Harper and Brothers.

General anesthesia produced by intravenous injection was first used in 1872, but only in the last ten years has it received wide attention. Because of its many advantages—rapidity and ease of induction, controlled dose, short recovery, absence of psychic shock and vomiting, maintenance of blood pressure, etc., this method of inducing anesthesia has earned a place as an accepted procedure for certain cases.

Dr. Adams discusses the problem of intravenous anesthesia and the materials and the technics involved in a thorough and scholarly manner. The book is carefully written and apparently is a comprehensive presentation of the subject. Extensive bibliographies are added to each chapter, and many carefully prepared tables are used.

Because of the infrequent indications for intravenous anesthesia in dentistry, the book will have a limited use by dentists, but any one interested in the subject will wish to study a copy.—*M. K. Hine.*

Dental Practice Management, Including Ethics, Economics and Socio-Economics and Jurisprudence as Applied to Successful Practice Management. By William H. O. McGehee, D.D.S., M.D., formerly Professor of Dental Pathology, Pharmacology and Therapeutics and Dean, Dental Department, Medical College of Virginia; Professor of Operative

Dentistry and Secretary, New York University College of Dentistry, etc.; and Alfred S. Walker, D.D.S., Professor Emeritus of Pulp Canal Therapy and Special Lecturer on Practice Management, New York University College of Dentistry, etc. 290 pages. First Edition. Price $3. Chicago: Year Book Publishers, Inc., 1944.

Literature on the technic of dental practice management is indeed scarce, yet every one agrees that the careful organization of a dental practice is essential to success and happiness in the practice of dentistry. This book has been written to serve as a text book for a course in the art of practice management and a reference book for all dentists who realize that they need information on the fundamentals of organization and management of a dental practice.

The book is divided into three sections, which cover ethics as applied to dental practice, the business management of professional practice and jurisprudence. It is true that one cannot teach a system of practice management that is applicable to all men in all locations. The authors realize this and present facts which are designed to help him determine his own needs and decide the type of practice for which he is fitted and the type that he wishes to build. The book contains much that will be helpful to the recent graduate in many of the serious and complex problems associated with dental practice management.—*M. K. Hine.*

Recent Advances in Anesthesia and Analgesia. C. Langton Hewer, M.B., B.S. (Lond.), D.A. (Eng.), Senior Anesthetist, St. Bartholomew's Hospital and St. Andrew's Hospital, Dollis Hill. 343 pages and 141 illustrations. Ed. 5. Price $5.50. Philadelphia: Blakiston Company.

The new edition of Hewer's popular book on anesthesia and analgesia was written in England under arduous conditions, yet many changes have been made since the fourth edition was published just a year ago. Additional information on anesthesia for thymectomy, intravenous general anesthesia with procaine, etc., has been included and some of the subject matter has been reorganized. The author discusses briefly the theoretical aspects of inhalational anesthesia, and premedication, nitrous oxide, the ethers, recent developments in endotracheal anesthesia, intravenous anesthesia and analgesia, etc. He also considers briefly the technics of anesthesia for various types of surgical procedures, and the sequelae of anesthesia. One chapter of nine pages is devoted to anesthesia in dental surgery. This particular chapter is entirely too short to be of much value to the dental student or the dentist.

This book will serve as an introduction to or a review of the subject of anesthesia and analgesia rather than a comprehensive reference book or textbook.—*M. K. Hine.*

Books Received

Anatomy as a Basis for Medical and Dental Practice. By Donald Mainland, M.B., D.Sc., F.R.C.S. New York: Paul H. Hoeber, Inc., 1945.

Approved Laboratory Technic. By John A. Kolmer, M.S., M.D., Dr.P.H., LL.D., L.H.D., F.A.C.P., and Fred Boerner, V.M.D. New York: Appleton-Century Co., 1945.

Penicillin Therapy. By John Kolmer, M.S., M.D., Dr.P.H., Sc.D., LL.D., L.H.D., F.A.C.P. New York: Appleton-Century Co., 1945.

CASES AND COMMENTS

Anomaly of Eruption

I. B. Hyams,* D.D.S., Montreal South, Quebec.

The accompanying x-ray film shows a second molar impacting a first molar. The third molar is in buccoversion. Clinically, the occlusal surface of the first molar is visible, the gingival covering having been resorbed. In view of the fact that the remaining teeth erupted normally, some local condition must have been responsible for the

Second molar impacting first molar.

anomaly of eruption. The second molar erupted at the normal time, but its slight mesial drift caused the impaction of the first molar.

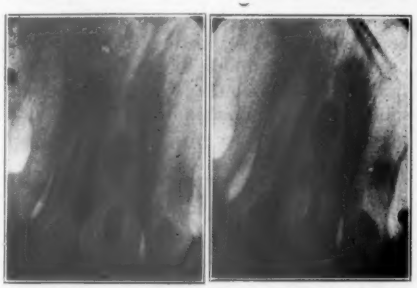
Here, we must presuppose either a failure of the eruptive force in the apical region of the first molar and its adnexa or a condensation of the bone covering the occlusal surface of the tooth, with resultant difficulty in osteoclasis or, finally, failure of osteoclasis of the normal bone covering the tooth.

Jacques Cartier Barracks.

Internal Resorption of Root Following Trauma

E. M. Silverberg,† D.D.S., Camp Kearns, Utah.

History.—A soldier, aged 20, seen December 18, 1943, had a pulpless upper left central incisor with a cavity through the cingulum into the pulp chamber. In March 1943, while participating in authorized drill, he slipped and his partner fell on top of him, the edge of the helmet liner striking him across the upper lip. Severe pain was felt at the time, but there was no cut or abrasion of the lip or gums, and the patient was not aware that the tooth was affected. In October, while stationed at another field, he suddenly developed an acute labial cellulitis over the area, with considerable throbbing pain, but no serious symptoms. The tooth was opened through the cingulum, the pulp



Resorption of root from trauma.

chamber being entered to establish drainage. A small quantity of pus having a foul odor was present. Some immediate relief was obtained by the drainage. The patient came back two days later because the swelling had not subsided and there was still some pain. The gingiva was lanced to establish better drainage and the swelling receded that night. The patient had been symptom free since that time.

Examination.—There was no swelling, no discoloration of the tooth, no drainage and no tenderness on percussion. Response to heat and cold was negative. Roentgenologic examination revealed an irregular radiolucent area in the middle third of the root. The peridental membrane was slightly thickened, with a moth-eaten appearance of the apex.

Diagnosis.—Internal resorption of the root following trauma was diagnosed.

Prognosis and Treatment.—If the resorptive process has not advanced too far, pulp extirpation and root filling may preserve the tooth. This treatment is efficacious only in the initial stages of the lesion. When there is perforation, with peripheral involvement, the outlook is hopeless unless the resorption

*Captain (DC).

†Lieutenant Colonel (DC).

is near the apex of the tooth, in which case apicoectomy may be of very great help.

Comment.—Internal resorption of the root is a rare condition. Thoma has used the term "idiopathic resorption" to describe this condition for which the true etiology is, as yet, unknown. The purpose of this report is to give evidence that internal resorption may follow trauma. The lesion starts in the pulp in the middle third of the tooth and an internal granuloma forms. In advanced cases, the tooth becomes considerably weakened and ultimately fractures. If perforation occurs before complete fracture, the epithelium may grow into the tooth and proliferate similarly to the epithelium contained in a periapical granuloma.

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Double Lateral Incisors

F. CARLYLE JONES, D.D.S., Peoria, Ill.

The accompanying roentgenogram shows the upper left maxillary region in a woman aged 50. It will be noted that, in addition to the normal complement of teeth, there is present a second left lateral incisor. Both

Supernumerary left lateral incisor.

lateral incisors are of normal size and in perfect alinement. The same condition was formerly present on the right side of the arch, but one lateral incisor had been extracted and replaced by a pontic attached to a three-quarter crown on the remaining lateral incisor.

125 South Jefferson Avenue.

Case of Perfect Dentition

GEORGE L. KENNEDY, D.D.S., Villa Grove, Ill.

Recently, the public press has published several articles dealing with cases of perfect dentition and one case was published in THE JOURNAL. The perfect dentition of these young persons is, to me, not remarkable in spite of the shortcomings of the modern diet and modern way of life. We cannot predict what the results may be in those cases fifty years hence.

The case here presented is the most remarkable one in my forty years' experience.

July 7, 1944, a man, aged 83, sought relief of soreness in the region of the lower right third molar. Examination of the mouth revealed thirty-two perfectly formed and perfectly occluded teeth with no cavities. There was some gingival recession around the molar in question and some pericementitis was present. The patient had never given his teeth any care, but inquiry elicited the fact that he used sugar and sweets very sparingly. He was a tobacco user, but the occlusal surfaces were not seriously worn down.

Traumatic Hemorrhagic Cyst of the Mandible in an Infant

ROBERT A. ROBINSON, D.D.S., Albany, N. Y.

Hemorrhagic cyst of the jaw was first mentioned by C. J. Lucas[1] in 1929. Theodor Blum[2] was the first to present the pathology of this lesion. Similar lesions were subsequently reported by Schneider (1931), Thoma (1931) and Ivy and Curtis. Ivy states that all cases described have occurred in adolescents.

History.—A boy, aged 2½ years, first seen by me May 4, 1943, gave a history of a fall with injury to the chin twelve months previously. R. G. Noyes, Troy, N. Y., saw the boy several months after the injury, at which time there was a swelling 3 by 4 cm. on the labial aspect of the mandible in the region of the right incisors. The right first and second incisors were missing, having been dislodged and detached at the time of injury. The swelling extended upward beyond

Fig. 1.—Radiolucent area, with condensation of bone at periphery.

Fig. 2.—Bone repair in lower half of cusp cavity; poor development of central incisor.

the incisal plane of the contiguous teeth. It was painless and fluctuant. Dr. Noyes diagnosed the condition as a cyst.

Examination.—X-ray examination (Fig. 1) revealed a radiolucent circular area 2 by 3 cm. with condensation of bone at the periphery toward the midline.

Diagnosis.—From the history of trauma and the clinical and x-ray findings, a diagnosis of traumatic hemorrhagic cyst was made.

Operation.—On surgical exposure under general anesthesia, there was no apparent cyst membrane. The bone cavity was bare and contained blood. Examination of a small segment of contiguous tissue microscopically revealed "polypoid tissue and dense fibrous tissue infiltrated with leukocytes, showing foci of hemorrhage. . . . no demonstrable epithelial lining."

Outcome.—The area healed rapidly by granulation. Clinical and x-ray examination (Fig. 2) nine months later, January 31, 1944, revealed bone repair in the lower half of the cyst cavity, but poor development of the permanent right central incisor, visible at age of 3. The coronal portion was discolored and contained many pits and grooves.

Comment.—This morphologic aberration may logically be attributed to the injury.

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100 State Street.

Extensive Erosion of Tooth Roots

GEORGE GOLDSTEIN, D.M.D., Saratoga Springs, N. Y.

The accompanying preoperative film and postoperative photograph show a case in which the roots of the lower right second molar had been eroded by an abscess. There was a large pointing area on the buccal aspect of the second and third molars.

412 Broadway.

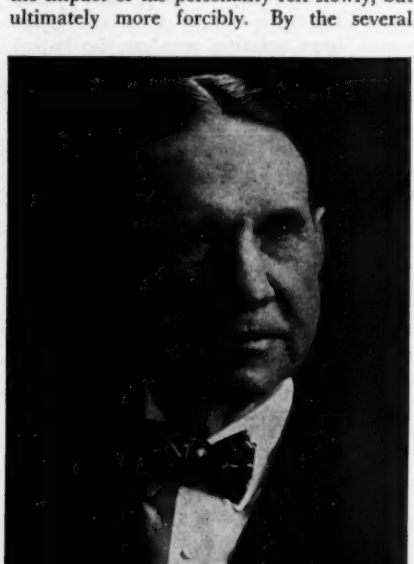
Fig. 1.—Preoperative x-ray film.

Fig. 2.—Roots of molar eroded by abscess.

DEATHS

WAY, TIMOTHY IRVING, Cincinnati, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1894; died March 16; aged 80. Past president of the Cincinnati and Ohio Dental Societies, member of the faculty of Ohio College of Dental Surgery, chairman of the Callahan Award Commission, fellow of the American College of Dentists.

The dental profession of Ohio has lost one of its most beloved, faithful and prominent members. The American Dental Association has lost an outstanding and interesting character. Many graduates of the Ohio College of Dental Surgery realize in retrospect the profound influence of Dr. Tim Way. His quiet restraint, his reserved dignity, made the impact of his personality felt slowly, but ultimately more forcibly. By the several thousand students who graduated during his tenure, he will always be revered and admired as a teacher in the highest sense; teacher of character as well as subject matter. Emerson once said that an institution is the lengthened shadow of one man. It may be said also that a profession is the lengthened shadow of a group of men. The profession of dentistry in Ohio is the lengthened shadow of Dr. Way and his illustrious confrères. Dr. Way was a rugged individualist, a prominent personality beloved by all who were fortunate enough to know him. He contributed unselfishly of his talents and abilities to the development of dentistry in Ohio. The inspiration that he gave and the contributions that he made to the Callahan Commission were largely responsible for the progress that has been made in this phase of dental surgery.



T. Irving Way
1864-1945

Dr. Way had no ambition to amass wealth, nor was he a seeker of fame and illusory honor. To him, those things that reach to the center of life: honesty of purpose and of speech, professional uprightness, loyalty to friends, a persistence of the cause of right as he understood it, were the goal of his ambitions. Coupled with these ambitions was his constant desire to be of help to those in need. His willingness to help others regardless of self, caused many dentists to become thoroughly familiar with the path to his door. When advice was necessary, how unstintingly he gave it!

His charming personality, alert mind, nimble wit and repartee endeared him to his patients and his large circle of friends. His love for art, music and literature brought to him an understanding of life possessed by very few. He was a courageous man. The trials and tribulations of his early career, the crushing grief that was his upon the loss of his beloved wife that could have been endured only by one whose courage was as great as his. The heart and soul of this man, Tim Way, has enriched life. Who is there that can tell the length and breadth of his benediction? The writer sat with him often in counsel and at each session always admired his virile character and silently applauded the sterling qualities of his pro-

fessional principles. I believe the Creator endowed him with an unusual ability to help lead those in doubt to a better understanding of their professional responsibilities.

At too frequent intervals in the later years of life, shadows pass over the path of life. The realization that a friend has slipped silently away into the vastness of the unknown leaves one conscious of the fact that another friend has become an aching, but beautiful memory. On the roll of the departed members of the Ohio State Dental Society, there appear many brilliant and inspiring names that will be honored to the end of time. Among them will be that of Timothy Irving Way. He was not only a great and successful dentist, and an outstanding teacher, but also a loving husband, an exemplary American citizen, a loyal friend to every right thinking individual. Dentistry has sustained an irreparable loss in his passing. However, his sterling and lovable character and his magnificent record will ever be a beautiful memory and an inspiration to us all.

To our departed friend, leader and teacher, we make this intercession: "That he may rest in peace and that light perpetual may shine upon him. For the bereaved family, that God may comfort them and give them resignation to His will."—*W. H. Scherer.*

ADAMS, CHARLES W., Detroit, Mich.; died March 14; aged 66.

ALLEN, R. T., Lumberton, N. C.; Baltimore College of Dental Surgery, 1898; died February 15; aged 70.

ANDERSON, WILLIAM B., Portsmouth, Va.; Howard University, College of Dentistry, 1911; died February 25.

BARK, ARTHUR W., Scotch Plains, N. J.; New York College of Dentistry, 1904; died in December.

BARRETT, LELAND, New York City; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1905; died March 7; aged 66.

BENT, ERNEST, Braintree, Mass.; Baltimore College of Dental Surgery, 1891; died March 16; aged 84.

BERNSTEIN, ARTHUR I., New York, N. Y.; died April 2; aged 72.

BODE, ROY E., Akron, Ohio; Starling-Ohio Medical College, Department of Dentistry, 1907; died March 26; aged 55.

BRADLEY, JOHN L., New Haven, Conn.; died March 21; aged 72.

BRANDES, ALBERT E., Hawthorne, Calif.; died February 20; aged 72.

BREWER, H. M., Dayton, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1898; died March 28.

BROOKS, J. H., Middleboro, Ky.; University of Louisville, School of Dentistry, 1921; died January 16.

BROWN, CHARLES T., Luverne, Minn.; University of Minnesota, College of Dentistry, 1926; died March 20; aged 42.

BROWN, NICKELL F., Oak Park, Ill.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1900; died March 24; aged 67.

BRYTE, A. L., Dexter, Mo.; died February 14; aged 73.

BUCHANAN, GEORGE A., Cincinnati, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1914; died March 10; aged 53.

BUDLONG, GEORGE M., Daytona Beach, Fla.; University of Buffalo, School of Dentistry, 1902; aged 65.

BURTON, F. H.; Pawnee City, Nebr.; died March 3; aged 83.

CAMPBELL, ALBERT P., Spencer, Ind.; Indiana University School of Dentistry; died December 25; aged 63.

CARBINIER, CHARLES F., San Bruno, Calif.; University of Southern California, College of Dentistry, 1925; died January 26. Dr. Carbinier was a lieutenant commander in the United States Naval Reserves.

CARLSON, VICTOR R., Everett, Wash.; North Pacific College of Oregon, School of Dentistry, 1925; died March 31; aged 49.

CARR, SAMUEL L., Minneapolis, Minn.; Northwestern University School of Dentistry, 1901; died February 23; aged 65.

CATLIN, HOWARD A., Elmira, N. Y.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1921; died March 3; aged 44.

CHRISMAN, FREDERICK P., New Brunswick, N. J.; died recently.

CLARDY, WILLIAM A., Roanoke, Ala.; Southern Dental College, 1908; died January 22; aged 64.

COE, WINFIELD, W.; Portland, Ore.; died January 15; aged 52.

COMELLO, F. S., St. Joseph, Mo.; University

of Illinois, College of Dentistry, 1912; died March 4; aged 57.

CONNER, M. MASTERS, Tahlequah, Okla.; died of wounds in Germany, March 3. Dr. Conner was a captain in the United States Army Dental Corps.

COPENHAVER, R. P., Tazewell, Va., Dental Department, Medical College of Virginia, 1903; died recently.

CROWLEY, JOHN F., Chicago, Ill.; Marquette University, School of Dentistry, 1900; died April 4; aged 77.

CUNNINGHAM, H. E., Hobart, N. Y.; University of Buffalo, School of Dentistry, 1902; died March 1; aged 69.

DAVIS, CHARLES H., Newark, N. Y.; University of Buffalo, School of Dentistry, 1900; died March 25; aged 66.

DE FOE, ROQUE V., Providence, R. I.; died February 5.

DEMMITT, GEORGE W., Frederick, Md.; died April 3; aged 83.

DILWORTH, TOWNSEND P., Philadelphia, Pa.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1903; died April 5; aged 60.

DIXON, C. V., Gary, Ind.; Meharry Dental College, Dental Department of Meharry Medical College, 1916; died April 11; aged 54.

EDWARDS, DAVID K., Cincinnati, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1907; died February 21; aged 68.

FAIRWEATHER, NORMAN S., Honolulu, Hawaii; College of Dentistry, University of California, 1899; died February 11; aged 71.

FEGLEY, IRWIN F., Philadelphia, Pa.; Medico-Chirurgical College of Philadelphia, Department of Dentistry, 1900; died March 25; aged 74.

FLORENCE, WILLIAM C., Cleveland, Ohio; Western Reserve University School of Dentistry, 1941; killed in the crash of a Navy transport plane in San Francisco Bay, February 13. Dr. Florence was a lieutenant in the Navy Dental Corps.

FOSTER, H. B., Chipley, Ga.; Atlanta Dental College, 1914; died April 6; aged 52.

GOLDENBERG, ALEXANDER M., Boston, Mass.; died January 23.

GOULDING, CHARLES E., Chicago, Ill.; died March 24; aged 70.

GRATZ, SAMUEL N., Brooklyn, N. Y.; College of Dental and Oral Surgery of New York, 1906; died December 22.

GREER, FRANKLIN M., Duluth, Minn.; Northwestern University Dental School, 1900; died February 20; aged 68.

GRIFFING, CURTIS R., Wesleyville, Pa.; University of Pittsburgh, School of Dentistry; died March 15; aged 41.

HARDY, CHARLES S., Summit, N. J.; Indiana University School of Dentistry, 1889; died April 20; aged 78.

HOARD, WILLIAM TAYLOR, McKinney, Texas; Vanderbilt University, School of Dentistry, 1898; died February 16.

HOBIN, EDWARD W., Utica, N. Y.; University of Buffalo, School of Dentistry, 1911; died March 19; aged 66.

HODDER, CHARLES A., Albany, N. Y.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1907; died March 28; aged 60.

HOLTZENDORF, C. P., Atlanta, Ga.; Atlanta-Southern Dental College, 1909; died February 7.

HUGHES, G., Elizabethton, Tenn.; Atlanta-Southern Dental College, 1925; died February 19; aged 51.

JOHNSON, WILLIAM F., Harmon, N. Y.; died April 9; aged 64.

JONES, T. D., Rolfe, Iowa; State University of Iowa, College of Dentistry, 1916; died March 8; aged 53.

KERR, DAVID E., Conneaut, Ohio; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1897; died March 12; aged 72.

KUNTZ, ABRAHAM, New York, N. Y.; New York College of Dentistry, 1913; died March 31; aged 55.

LAIRD, FERNANDO RAY, Ada, Okla; died February 12.

LANGDALE, RUPERT H., Cincinnati, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1902; died March 25; aged 62.

LAUTENBURG, JOSEPH, Dayton, Ohio; Pennsylvania College of Dental Surgery, 1901; died February 24; aged 69.

LOBIG, PETER P., St. Louis, Mo.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1898; died March 6; aged 75.

LOFLIN, ALBERT A., Jackson, Miss.; Atlanta Dental College, 1913; died January 17; aged 59.

LYNCH, JEANNE E., Superior, Ariz.; North Pacific College of Oregon, School of Dentistry, 1903; died February 19; aged 77.

MCCARTER, WILLIAM A., Tulsa, Okla.; Kansas City Dental College, 1887; died recently; aged 87.

MARPLE, A. I., Huntington, W. Va.; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1913; died March 26; aged 57.

MARTIN, P. H., Warren, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1903; died March 15; aged 67.

MAYES, STEPHEN, Nebo, Ill.; died February 17.

MICHNOFF, LEOPOLD H., Brooklyn, N. Y.; New York College of Dentistry, 1905; died in January.

MOREY, LOREN S., Breckenridge, Mich.; died March 23; aged 87.

MORRIS, LOUIS A., Oregon City, Ore.; North Pacific Dental College, 1902; died March 11; aged 64.

MOTIS, FRANK A., Omaha, Nebr.; Baltimore Medical College, Dental Department, 1904; died February 15; aged 64.

NANCE, WILLIAM L., Ft. Valley, Ga.; Atlanta-Southern Dental College, 1912; died March 9; aged 56.

NANKERVIS, HENRY, Negaunee, Mich.; died February 20.

NICKERSON, ROSCOE W., Fresno, Calif.; College of Physicians and Surgeons of San Francisco, a School of Dentistry, 1921; died February 4; aged 47.

OGDEN, MAX, Covington, Ky.; Cincinnati Dental College; died March 16; aged 58.

OLDFATHER, GERALD, Fort Wayne, Ind.; died in December; aged 41.

O'LONE, WALTER, Washington, D. C.; died February 8.

OLSON, M. W., Galesburg, Ill.; Chicago College of Dental Surgery, 1897; died April 21.

O'NEILL, WALTER B., Rochester, N. Y.; University of Michigan, College of Dental Surgery, 1908; died March 25.

PASELTINER, JOSEPH P., Yonkers, N. Y.; College of Dental and Oral Surgery of New York, 1912; died March 14; aged 45.

PERESMAN, JACOB J., Carnegie, Pa.; died February 15.

PIERCE, FREDERICK G., Worcester, Mass.; Harvard University Dental School, 1917; died February 28.

PIRSCH, L. R., Olivia, Minn.; University of Minnesota, College of Dentistry, 1914; died February 22; aged 64.

POCKER, IRVING, Bronx, N. Y.; New York College of Dentistry, 1914; died March 15.

POLITZER, JULIUS M., Cleveland, Ohio; Temple University School of Dentistry, 1904; died April 4; aged 64.

POMFRET, JOHN W., Newton, Mass.; Boston Dental College, 1895; died March 1; aged 82.

PUCKETT, HARRY C., Seattle, Wash.; Northwestern University Dental School, 1901; died March 10; aged 70.

RABUS, EDWARD D., Montclair, N. J.; Indiana University School of Dentistry, 1897; died April 2; aged 69.

READ, SALATHIEL D., Eugene, Ore.; died February 21; aged 73.

REYNOLDS, STANLEY S., Bath, N. Y.; Pennsylvania College of Dental Surgery, 1906; died April 12; aged 60.

RICH, ROBERT R., Boston, Mass.; died March 18; aged 64.

RIVERS, STANFORD LEE, Brunswick, Ga.; Atlanta-Southern Dental College, 1900; died February 6; aged 78.

ROGERS, C. TRUMAN, New Rochelle, N. Y.; died March 22.

ROGERS, ROBERT L., Mulberry, Ark.; Birmingham Dental College, 1898; died February 8; aged 85.

ROTHWELL, BERTRAM S., Cleveland, Ohio; Western Reserve University School of Dentistry, 1912; died March 23; aged 55.

ROWAN, WILLIAM A., Tifton, Ga.; Atlanta Dental College, 1916; died March 10; aged 64.

RUBERG, MORRIS I., Philadelphia, Pa.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1916; died February 18.

SARGEANT, PHILIP E., New Castle, Pa.; killed in action in Belgium, February 1; aged 37. Dr. Sargeant was a captain in the United States Army Dental Corps.

SCOTT, J. R., Sweet Springs, Mo.; Kansas City Dental College, 1917; died January 19; aged 49.

SIEBERG, E. M., Genoa City, Wis.; Mar-

quette University, School of Dentistry, 1915; died December 20.

SITZER, CHARLES L., Hunter, N. Y.; died March 13; aged 67.

SNEAD, W. R., Houston, Texas; Atlanta Dental College; died February 25; aged 68.

SPANTON, ALLEN F., Port Orchard, Wash.; died March 26.

SPOON, R. E., Winston-Salem, N. C.; Atlanta Dental College, 1917; died March 9; aged 52.

SPROULL, WILLIAM A., Slippery Rock, Pa.; Western Reserve University, School of Dentistry, 1901; died March 21; aged 66.

STEIN, ALEXANDER, Brooklyn, N. Y.; University of Maryland, School of Dentistry and Baltimore College of Dental Surgery, 1901; died April 6; aged 68.

STEINMAN, ANSEL, New York, N. Y.; died March 28; aged 38.

STEWART, EDWARD L., Kansas City, Mo.; died January 24; aged 68.

SWAYZE, NATHAN L., Yazoo City, Miss.; Marion-Sims Dental College, St. Louis, 1902; died March 8; aged 65.

TASHJIAN, NISHAM DER SARIKIS, Watertown, Mass.; Harvard University Dental School, 1912; died January 24.

THOMPSON, NED L., Kirkland, Ind.; Indiana University School of Dentistry, 1926; died February 7; aged 42.

TULLES, RUSSEL P., Yuma, Ariz.; School of Dentistry, University of Denver, 1918; died February 14; aged 61.

URBAN, CHARLES, Pleasantville, N. Y.; New York College of Dentistry, 1899; died March 4; aged 65.

WAGNER, JOHN F., Seattle, Wash.; died March 16; aged 88.

CURRENT LITERATURE

Medical Survey of Nutrition in Newfoundland. By J. D. Adamson et al. Canad. M. A. J. 52:227, March 1945.

A clinical examination of 868 people from the city of St. John's and several outposts in Newfoundland was made to determine the nutritional status of the population of that country. Chemical analyses of the body fluids of nearly one-half of these subjects and an investigation of the available food supply were also made.

The height of the children was about average as compared with that of school children in Canada and England. The body weight in both sexes was generally low. Muscular development was very poor in many subjects of all ages and both sexes. The gingival and dental conditions were generally poor, 40.6 per cent showing red, hyperemic gums and 61.4 per cent severe caries.

Other conditions gave evidence of nutritional deficiencies due to lack of vitamin A, riboflavin and ascorbic acid. Evidence due to lack of thiamine was encountered much less frequently, but in an appreciable number of the people. Mild acute and chronic niacin deficiency was of frequent occurrence in the population examined. Signs of rickets were seen in comparatively few subjects. Only moderately low hemoglobin values were found in a proportion of the population and no evidence of protein deficiency was encountered.

Compared with the recommended allowance, the average available food supply was adequate in calories, protein and fat, but was extremely low in vitamin A, riboflavin and ascorbic acid. The supply of thiamine, although relatively better than that of the above-noted nutrients, was still inadequate. The amount of niacin was at the recommended level. Iron was somewhat below the recommended level, while calcium was extremely low. It is emphasized that the comments refer to the average figures; that few eat such amounts, and that the food actually consumed by many persons is undoubtedly less satisfactory than is suggested by the average figures.

The chemical findings also indicated an unsatisfactory intake of these nutrients in a

high percentage of the population. On the whole, a close correspondence was found between the food deficiencies and the chemical and clinical signs of malnutrition. The poor nutritional status of the people of Newfoundland may well be in large part responsible for their impaired health and efficiency. —*S. Wah Leung.*

Association of Local Factors with Gingivitis. By H. B. Shay and G. A. Sinart. Brit. D. J. 78:135, March 1945.

Two groups of airmen chosen at random were examined for possible association of local conditions with gingivitis. The results show that chronic gingivitis is closely related to (1) the presence of large numbers of fusospirochetal organisms, this being uncommon in mouths with normal gums; (2) the presence of calculus both supragingival and infragingival more frequently than in normal mouths; (3) the absence of many fillings in the mouth, and (4) the presence of untreated caries. The relationship of these conditions to chronic gingivitis is not necessarily one of cause and effect; but the close association of chronic gingivitis with these local conditions does suggest that they play a part in production of the disease.—*S. Wah Leung.*

Clinical Appraisal of Infants' Head Size. By Julian D. Boyd. Am. J. Dis. Child. 69:71-82, February 1945.

The size of infants' heads is directly related to body length. For infants whose body length does not exceed 75 cm., a simple formula can be used to predict the average head circumference, regardless of sex or age. The probability of abnormal growth of the intracranial contents can be estimated through proper appraisal of head size and body length.—*Paul H. Keyes.*

Role of Fat in Incisor Depigmentation of Vitamin E Deficient Rats. By Humberto Granados and Henrik Dam. Science 101:250, March 9, 1945.

In order to investigate a possible relationship between the dietary fat contained in the vitamin E deficient diets and the disappearance of the normal brown-yellow pigment of the rat incisors in animals kept on the same diets, five groups of newly weaned rats were kept for eighty days on the following diets: Group 1, vitamin E deficient, fat free; Group 2, vitamin E containing, fat free; Group 3, vitamin E deficient, high fat (20 per cent cod liver oil); Group 4, vitamin E containing, high fat (20 per cent cod liver oil); Group 5 (normal control), dog chow. Animals in groups 1, 2 and 4 developed incisor pigment in the same way as in group 5; i.e., color intensity increased as in the normal controls. In group 3, pigmentation of the maxillary incisor teeth occurred as in other groups until about the twentieth day, when an abrupt disappearance of pigment was observed at the gingival margin. Thereafter, depigmented enamel progressively replaced pigmented enamel as the teeth erupted. All animals of group 3 had bluish white maxillary incisors after forty-five days. These results indicate that depigmentation of incisors in vitamin E deficient rats requires the presence of fat, presumably unsaturated fatty acids, in the diet; a finding which suggests that the phenomenon is related to some abnormal deposition or reaction of fat in the ameloblasts.—*Humberto Granados.*

Deamination of Amino Acids by the Human Oral Flora; Its Role in Dental Caries Immunity. By R. G. Kesel, J. V. O'Donnell and E. R. Kirch. Science 101:230-231, March 2, 1945.

It has been demonstrated that *L. acidophilus* is missing from mouths of patients who have no active caries; that the saliva of these persons does not rapidly convert glucose into acid, and that viable *L. acidophilus,* when placed in the saliva or oral cavity of such persons, has disappeared from cultures made six to eight hours later.

Human saliva introduced into a beef broth medium, incubated for eight days and then filtered through a Seitz filter, contained something that was bactericidal to *L. acidophilus.* Experiments proved this inhibitive factor to be ammonia nitrogen. Amounts as low as 0.5 mg. of ammonia nitrogen per milliliter were found efficient in inhibiting *L. acidophilus* growth and in preventing fermentation of glucose. Early studies indicate that the ammonia is derived from various amino acids as well as urea and mucin.

Preliminary experiments have revealed that caries immune individuals have enzyme systems capable of converting at least six amino acids into ammonia nitrogen. These are arginin, alanine, aspartic acid, asparagin, glumatic acid, isolecuine and serine. The study to date suggests that caries immunity is based on the production of minute, but continuous amounts of ammonia in the bacterial plaque resident on the tooth surface. The pabulum from which the ammonia is derived is apparently a small group of amino acids. These are present in the mouth as a result of the type of diet and body metabolism.—*S. Wah Leung.*

Adamantinoma of the Maxillary Sinus. By Walter F. Mosher. Arch. Otolaryng. 40:61-62, July 1944.

Adamantinoma occurs more frequently in the mandible than in the maxilla, and involvement of the maxillary sinus is rare. In the case reported, the patient was a man, aged 61, who complained of nasal obstruction and discharge from the left side of the nose and pain over the left maxilla. There was some swelling over the maxilla. He gave a history of a recent injury in this area. Roentgen-ray examination showed that the left antrum was filled with a large mass. All the other sinuses were clear. On opening the antrum by the Caldwell-Luc method, a large mass was found to fill the cavity. Removal of as much of the mass as possible resulted in severe bleeding, making it necessary to pack the antrum. Histologic examination of the specimen showed glandular adamantinoma. As this is a slow-growing tumor, its presence could not be attributed to a recent injury. Nine months later, the growth was dissected out after the external carotid artery had been tied. "Rather intensive" x-ray treatment was then given for two months. There has been no evidence of recurrence of the tumor in two years. A more careful study of the history of this patient prior to removal of the growth showed that, five or six years earlier, a dentist had curetted "what he told the patient was a small cyst" at the base of a molar tooth in the left maxilla after removal of the tooth. The author considers it "reasonable to suppose" that part of the cyst wall was not removed and this irritation initiated the tumor growth.—*S. Wah Leung.*

Calcium Content of Samples of Commercial Bread. By E. M. Semmons and E. W. McHenry. Canad. M. A. J. 52:265, March 1945.

Samples of ordinary white bread, Canada approved white bread and brown and whole wheat bread from eight large bakeries and two small "home" bakeries in Toronto were analyzed for calcium content. The values found were 12.7 to 58:2 mg. per hundred grams in ordinary white breads; 35.5 to 72.0 mg. per hundred grams in Canada approved white bread, and 16:5 to 95:0 mg. per hundred grams in brown and whole wheat bread. Bread from large bakeries contained appreciably more calcium than did bread from small "home" bakeries. Analyses of ingredients used for one batch in a large bakery showed that more than half of the calcium in the bread was contributed by chemicals used to improve fermentation, while less than one quarter was furnished by the flour. —*S. Wah Leung.*

Maxillary Sinusitis of Dental Origin. By F. L. M. K. MacGaugan. Canad. M. A. J. 52:283, March 1945.

Because of the past success in the treatment of chronic maxillary sinusitis with a suspension of sulfathiazole powder in glycerin, a similar conservative treatment was tried in two cases of maxillary sinusitis of dental origin. The etiology of these two cases was confirmed by their dental history of extraction of upper first molars, subsequent antral fistulae and resulting maxillary sinusitis with a profuse and foul postnasal discharge.

The treatment recommended consists of daily antral lavage with a normal saline solution and instillation of a suspension of 20 per cent sulfathiazole powder in ordinary glycerin. In more severe cases, sulfathiazole by mouth is also advised.

Fistulae of the maxillary sinuses resulting from dental extractions should be closed with mucous membrane flaps after removal of the root fragments from the sinus. All such cases should be checked for infection of the sinus by an antral lavage following the healing of the flaps.—*S. Wah Leung.*

Importance of Oral Surgery to Prosthodontia. By Rae D. Pitton. J. Oral Surg. 2:289, October 1944.

Pitton discusses surgical preparation of the mouth for prosthodontia. Every dentist who removes teeth should leave the mouth in the best possible condition for dentures. The functional efficiency of correctly constructed dentures has always depended on the anatomic form and quality of the foundation upon which they must rest. "The preparation of a mouth for dentures should begin, not at that period when dentures are inevitable and their need immediate, but at the time the first permanent tooth is lost. No tooth should be removed without consideration being given the possibility that the patient may eventually become edentulous, and no tooth or teeth should be conserved if conservation may mean loss of the desired continuity and quality of the dental ridge tissues." Undercuts and protuberances should be removed. Too extensive elevation of the mucoperiosteum results in formation of fibrous tissue and loss of fold or sulcus. Unerupted upper cuspids should be removed palatally, if possible. Tuberosities that are in too close contact with the lower retromolar area should be reduced and reduction of the internal oblique ridge may be necessary to allow extension of the lingual flange of the lower denture.—*J. Orton Goodsell.*

Cysts of the Jaws. By George W. Christiansen. J. Oral Surg. 2:308, October 1944.

Christiansen discusses the differential diagnosis and treatment of cysts of the jaws, urging caution against errors in diagnosis in the region of the maxillary sinus. Injection of radiopaque fluids into cysts or sinuses is helpful. Aspiration of suspected cysts is sometimes necessary. Care should be exercised in the dissection of cysts that are adherent to the contents of the mandibular canal. Before enucleation of a maxillary cyst, the floor of the cavity should be explored with instruments to make certain that the lining of the mass is not fused to sinus or nasal floor membranes. If fusion exists, the Partsch type of operation is the one of choice. Cavities resulting from removal of large palatal cysts can be treated through prepared labial windows. Preservation of the alveolar ridge for prosthetic reasons is essential, if possible, and retention of teeth until later in the treatment may be desirable.—*J. Orton Goodsell.*

Actinomycosis Treated with Crude Lymph Gland Extract. By Ronald Y. Sung. J. Oral Surg. 2:328, October 1944.

Sung reports two cases of actinomycosis treated successfully with crude fresh lymph gland extract. Goat glands were ground and washed in physiologic solution of sodium chloride. After drainage and other routine treatment, the wounds were irrigated with the lymph gland extract. Clinical cures resulted in three or four weeks. The theory behind the use of this material as an irrigant is that some intrinsic factor in lymph glands prohibits growth of the fungus, as these glands are not involved in actinomycotic infections.—*J. Orton Goodsell.*

Conservative Surgical Treatment of Ameloblastoma of the Jaws. By Harry M. Seldin. J. Oral Surg. 2:333, October 1944.

Seldin, in a thorough discussion of ameloblastoma, with case reports, advocates conservative treatment and quotes Bernier's review of thirty-four cases in which but four recurrences followed conservative operation. Three of the four patients subsequently had resections. Roentgenographically, ameloblastoma must be differentiated from osteitis fibrosa, giant-cell tumor and traumatic and odontogenic cysts. Seldin also describes the clinical factors in diagnosis. Invasive infiltration of bone near the tumor necessitates cauterization after enucleation of the masses. Metaplasia to malignant forms, while rare, is possible. He reports twelve cases treated conservatively without recurrence. Unless there is complete destruction of the body or ramus of the mandible, resection is not considered. Intra-oral exposure is obtained and all pockets carefully cleaned of contents down to normal bone. This is followed by chemical or electric cauterization. Radiation therapy is not employed except in inoperable cases.—*J. Orton Goodsell.*

The Adamantinoma (Ameloblastoma) Originating from the Impacted Lower Third Molar Enamel Organ. By William E. Durbeck. J. Oral Surg. 2:350. October 1944.

Durbeck reminds us that ameloblastomas are not always polycystic. Monolocular adamantinomas are apt to present discernible roentgenologic differences from other odontogenic cysts. The enamel organ of the impacted lower third molar must be regarded as potential parent tissue for adamantinomas. Impacted teeth should be checked frequently for evidence of cystic disease. Radiation therapy probably is of some value in treatment of the ameloblastoma.—*J. Orton Goodsell.*

Osteopetrosis with Suppuration and Eventual Resection of the Mandible: Report of Case. By Eugene V. Linsey. J. Oral Surg. 2:369, October 1944.

Linsey reports a case of osteopetrosis, or marble bone, in an 8-year-old boy whose chief complaint was swelling and pain in the mandible. The alveolar bone was exposed and necrotic with a dense appearance. Roentgen examination showed hard bone. The course over a period of one year was one of progressive deterioration, hematologically and otherwise. Cataracts, optic atrophy, deafness, etc., also were present. Incision, drainage, resection of bone and removal of teeth were performed. The bones of the skull became irregularly enlarged. When the patient was last seen, there was no discharge, but the prognosis was considered poor as there is no known treatment.—*J. Orton Goodsell.*

Acute Meningitis as a Terminal Disease Resulting from Periocoronitis About a Partially Impacted Lower Third Molar: Report of Case. By Eugene V. Linsey. J. Oral Surg. 2:375, October 1944.

Linsey records a case of acute meningitis resulting from pericoronitis about a partially erupted lower third molar. The patient, a man aged 23, when first seen had obvious neurologic complications. Ten days before, he had visited his physician because of a sore jaw and submaxillary cellulitis, and had been given what was, apparently, a sulfa compound for home use. During the ten-day period, he became progressively worse. Roentgen lateral jaw films revealed an unerupted third molar with apical bone porosis. Suppuration was present intra-orally about the third molar. Surgical measures consisted of removal of the tooth, intra-oral drainage, extra-oral drainage of the submaxillary and parapharyngeal areas and tracheotomy at different times. The course was a septic one, with fatal termination. Necropsy revealed purulent meningitis and pneumonia. Sulfathiazole was used, but penicillin was unavailable.—*J. Orton Goodsell.*

ANNOUNCEMENTS

CALENDAR OF MEETINGS

National

American Dental Hygienists' Association, Chicago, September 17-19. A. Rebekah Fisk, 1704 N. Troy St., Arlington, Va., Secretary.

American Dietetic Association, Cincinnati, October 15-19.

Montreal Dental Club Annual Fall Clinic, October 24-26. M. L. Donigan, Drummond Medical Bldg., Montreal, Director.

State

Alabama: Board of Dental Examiners, Birmingham, July 2. Farrar McCrummen, Woodward Bldg., Birmingham, Secretary.

Arizona: State Dental Board, Phoenix, October 10. R. K. Trueblood, 25 N. Second Ave., Glendale, Secretary.

Arkansas: State Board of Dental Examiners, Little Rock, June 25-28. Clarence W. Koch, 817 Donaghey Bldg., Little Rock, Secretary.

Colorado: State Board of Dental Examiners, Denver, June 18-22. Harry D. Stanwood, Republic Bldg., Denver 2, Secretary.

Connecticut: Dental Commission, Hartford, June 19-23. Clarence G. Brooks, 302 State St., New London, Recorder.

Delaware: State Board of Dental Examiners, June 20-22. Charles R. Jefferis, Medical Arts Bldg., Wilmington, Secretary.

District of Columbia: Board of Dental Examiners, Washington, June 18. Henry A. Swanson, 1835 Eye St., N.W., Washington 6, Secretary.

Dental Society, Washington, second Tuesday of each month. J. Walter Bernhard, 1835 Eye St., N.W., Washington, Secretary.

Florida: State Board of Dental Examiners, Jacksonville, June 18-21. A. W. Kellner, P. O. Box 155, Hollywood, Secretary.

Indiana: State Board of Dental Examiners, Indianapolis, August 20-23. Carl A. Frech, Gary National Bank Bldg., Gary, Secretary.

Iowa: State Board of Dental Examiners, Iowa City, June 11-15. Harry G. Bolks, Sioux City, Secretary.

Kentucky: State Board of Dental Examiners, Louisville, June 19-22. W. F. Waltz, First National Bank Bldg., Lexington 3, Secretary.

Maine: Board of Dental Examiners of State of, Augusta, June 18-20. Carl W. Maxfield, 31 Central St., Bangor, Secretary.

Dental Society, Portland, June 14-16. Alonzo H. Garcelon, Division of Dental Health, Augusta, Secretary.

Maryland: State Board of Dental Examiners, June 4-6. Kyrle W. Preis, 700 Cathedral St., Baltimore 1, Secretary.

Massachusetts: Board of Dental Examiners, June 11-13. William H. Canavan, 413-N State House, Boston, Secretary.

Minnesota: State Board of Dental Examiners, Minneapolis, August 27-September 1. G. R. Metcalf, Barnesville, Secretary.

Montana: State Board of Dental Examiners, July 14. C. H. Swanson, Columbus, Secretary.

Nebraska: Board of Dental Examiners, Omaha, June 11-14; Lincoln, August 22-25. C. A. Bumstead, 924 Stuart Bldg., Lincoln, Secretary.

New Jersey: State Board of Registration and Examination in Dentistry, July 9-12. J. F. Burke, 150 E. State St., Trenton, Acting Secretary.

New Mexico: Board of Dental Examiners, Santa Fe, June 25-29. J. J. Clarke, Artesia, Secretary.

North Carolina: State Board of Dental Examiners, Raleigh, June 25. Wilbert Jackson, Rich Bldg., Clinton, Secretary.

North Dakota: State Board of Dental Examiners, Fargo, July 9-12. Richard Krause, Bismarck, Secretary.

Ohio: State Dental Board, Columbus, June 4-6, 7-9. Hygienists, June 5, 7-9. Earl D. Lowry, 79 E. State St., Columbus, Secretary.

Western Reserve Alumni Association, School of Dentistry, Fifty-Third Annual Reunion, Cleveland, June 11. Richard C. Beatty, Cleveland, Secretary.

Rhode Island: Board of Examiners in Dentistry, Providence, June 11-12. Archie A. Albert, 84 Broad St., Pawtucket, Secretary.

South Carolina: State Board of Dental Examiners, June 21-23. T. C. Sparks, 1508 Washington St., Columbia 23, Secretary.

Tennessee: Board of Dental Examiners, Memphis, June 18-22. James J. Vaughn, Medical Arts Bldg., Nashville, Secretary.

Vermont: State Board of Dental Examiners, Montpelier, June 25-27. Charles I. Taggart, 139 Bank St., Burlington, Secretary.

Virginia: State Board of Dental Examiners, Richmond, June 19. John M. Hughes, Medical Arts Bldg., Richmond 19, Secretary.

Washington: State Dental Association, Spokane, June 21-23. G. D. Williams, Paulsen Bldg., Spokane, President.

West Virginia: State Board of Dental Examiners, West Liberty, June 25-27. R. H. Davis, Goff Bldg., Clarksburg, Secretary.

Wisconsin: State Board of Dental Examiners, Milwaukee, July 9-13. S. F. Donovan, Tomah, Secretary.

INTERNSHIPS, EXTERNSHIPS, RESIDENCIES AND FELLOWSHIPS

Bronx Hospital, Dental Department, New York. Director, S. Burton Gerstner, Fulton Ave. at 169th St., Bronx 56, New York.

California, University of, Research Assistant, July 1. Willard C. Fleming, College of Dentistry, Medical Center, San Francisco 22, Dean.

Eastman Dental Dispensary, Rochester, N. Y. Director, Harvey J. Burkhart.

Greater New York Conference of Hospital Dental Services. Secretary, Mary E. Reilly, 386 Fourth Ave., New York.

Post-Graduate Hospital, New York. Superintendent, W. B. Talbot, 303 E. Twentieth St., New York 3.

Research and Educational Hospital, University of Illinois Medical Center. Address Dean, University of Illinois, College of Dentistry, 808 S. Wood St., Chicago 12.

Richmond Freeman Memorial Clinic for Infants and Children, Dallas, Texas. Dora B. Foster, 3617 Maple Ave., Dallas, Executive Director.

Walter G. Zoller Memorial Dental Clinic, University of Chicago. Address Director, Walter G. Zoller, Memorial Dental Clinic, University of Chicago, Chicago 37.

Carnegie Fellowships for Research and Graduate Work in the Dental Sciences, University of Rochester. George H. Whipple, Rochester, Dean.

Pathology, Dental and Oral, Fellowship in, Army Institute of Pathology. Address Director, American Registry of Pathology, Army Institute of Pathology, Army Medical Museum, 7th and Independence, S.W., Washington 25, D. C.

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